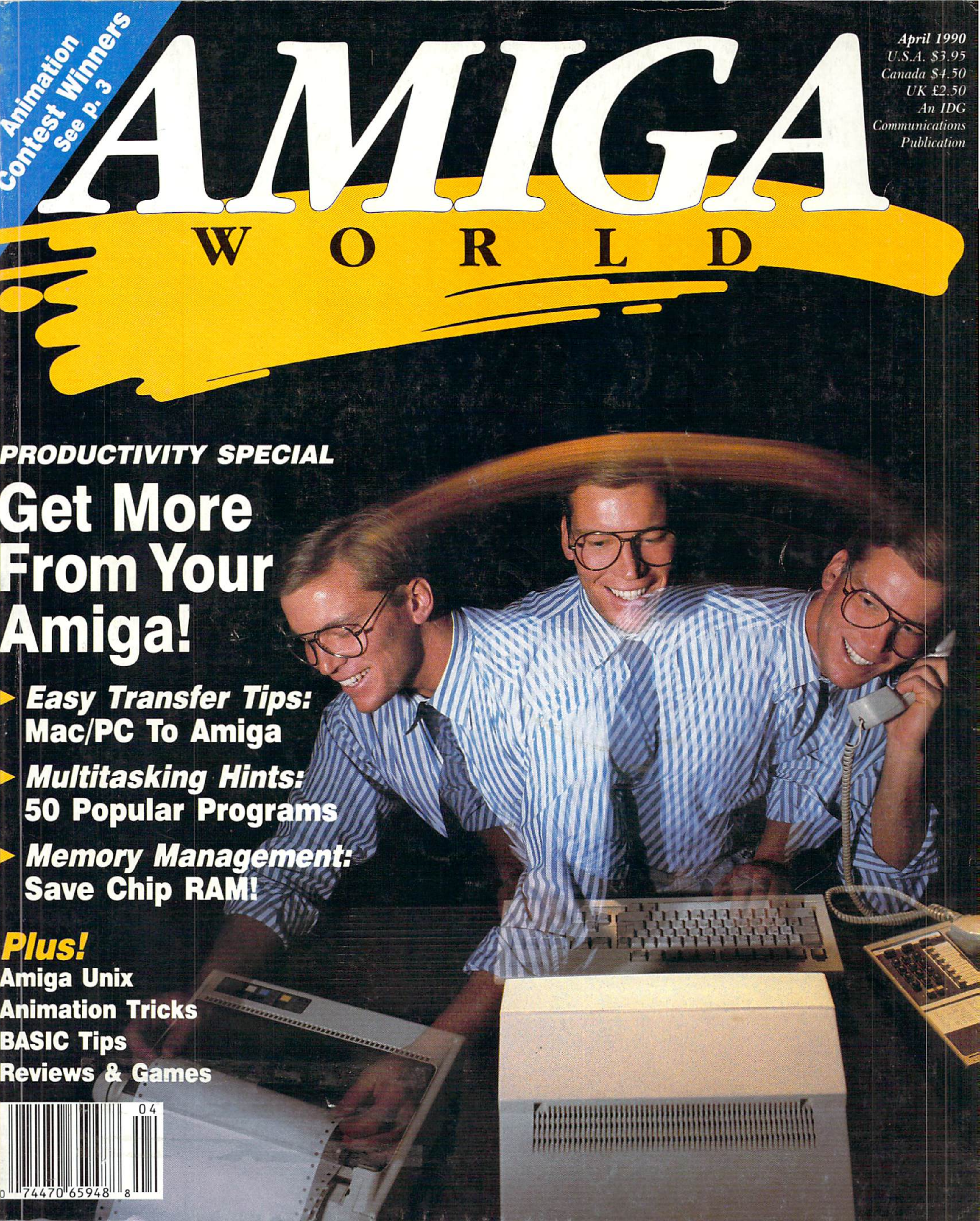

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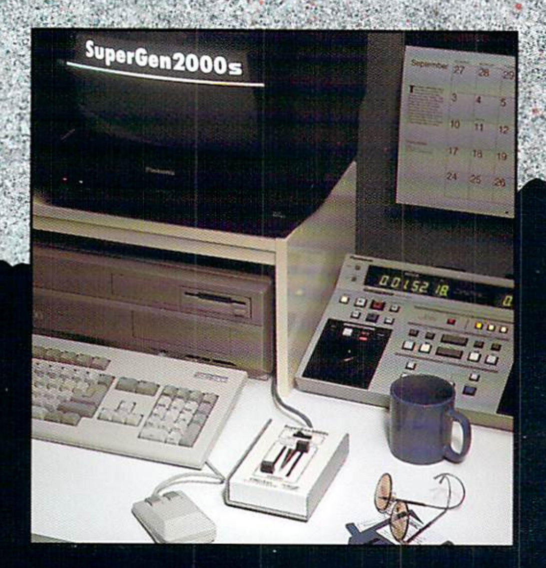
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COLUMNS

DEPARTMENTS

Opening up the borders between Amiga and the PC/Macintosh camps—p. 16.

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See *AW*'s **Animation Video** on p. 93 for more details.

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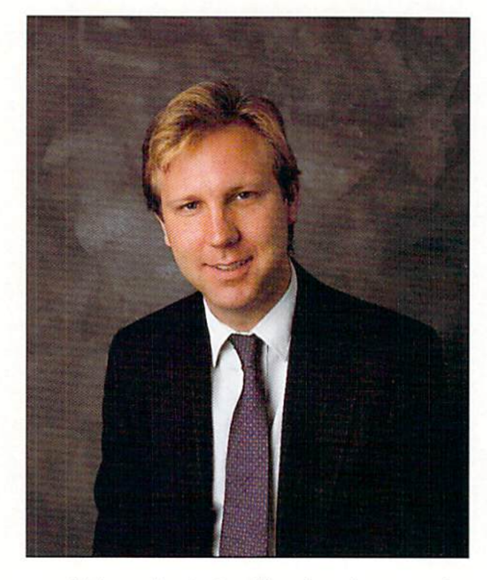
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CHIEF CONCERNS

Care for a slightly used operating system?



I'VE NEVER BEEN a big fan of the Unix operating system. This Bell Labs relic was far too difficult for normal humans to use, and far too large for normal computers. Like accounting or podiatry, the only reason some people liked Unix was that they understood it. . .and the rest of us didn't.

Unix is still too big, and if you have to get to its insides, it is still far too difficult to use. But it has two things going for it: growing industry support and a growing list of excellent applications. And with all the attention paid to high-powered workstations, Unix has even become exciting—something only a lunatic would have predicted.

Commodore is doing a wise thing by supporting the Unix standard proposed by AT&T, which includes the base operating system (Unix 5.4) and an Amiga-like graphical user interface developed by Sun called Open Look. To underscore the move, Commodore recently established a Systems Marketing Group, which will focus primarily on the release and marketing of Commodore's Unix-based products. The group will be headed by Paul Calkin, a former Unisys exec with over ten years of experience in Unix sales and marketing.

Amiga users seem a bit wary of Unix, but they shouldn't be. Unlike MS-DOS, which requires an additional hardware investment, Unix will run on high-end Amigas without modification, provided there is a large enough hard disk and enough RAM. Unix will solve problems for the Amiga that we never dreamed would be solved. It will solve these problems quickly, cleanly, and without a whole lot of effort, so we can all stop griping.

For years, the Amiga community has been begging for more mainstream applications, networking, and market credibility. Unix will give us all three.

We gain a tremendous amount by running Unix and Open Look. With a simple operating system upgrade, the Amiga will literally operate as a Sun workstation. We will gain the ability to run what will eventually be tens of thousands of applications. According to the group that proposed Unix 5.4, there are some 15,000 applications that the system will support, and more are being built every day. Not only are these applications multitasking, but many are also truly multiuser. Now that Lotus Development Corp. and other software biggies are supporting Unix, we no longer have to pine for their applications; we'll be too busy using them. And believe me, there are some wild apps being written for Unix—things you and I have never conceived of.

Unix also helps solve major networking problems. Let's face it, the hardware side of networking is relatively simple. It's just wires and boards and such. The hardest part is building applications that understand that a network exists, can effectively share data, and most importantly, actually share the processing load between multiple machines.

Most workstation applications have been built with networking in mind. An increasing number have been built so that they cooperate with other systems that store and manipulate vast quantities of data, which can be numbers, names, images, voices, or even motion video. The rest of the computing world is moving in this direction, and now so can the Amiga.

Unix also gives us credibility, and an entree into the huge corporate and government markets. This is something that all Amiga users, even those who are strictly game players or artists, should care about. A larger installed base and a healthier market benefits everyone. There will be more competition, new hardware and software, and stronger companies that will be able to support their products into the future.

Unix will not kill off the native Amiga operating system. In fact, most of us will never use Unix. But even if you think Unix is the worst operating system since CP/M or TRS-DOS, or never get a chance to look at it, you should still welcome it to the Amiga. ■

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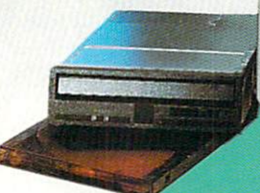
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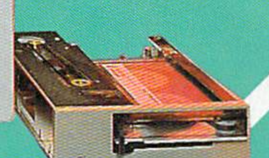
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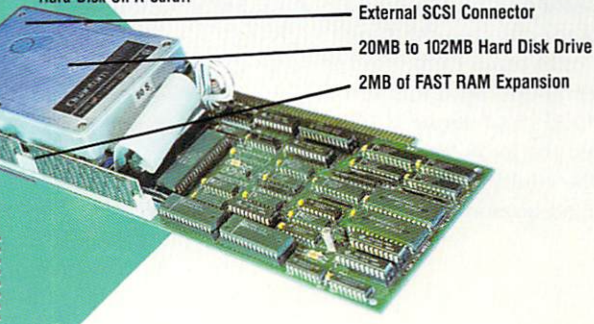
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REPARTEE

Comments, complaints, and concerns from AmigaWorld *readers.*

New Wave

THE NEW ELEMENTS you have added to your magazine are fantastic. The "Your Turn" boxes in the Reviews section give additional insight into the worth and possible applications of the product. The "Last Licks" column, as well as Peter Olafson's "Crib Notes," are assets. There is not a lot to complain about in this magazine.

One thing, though, that I wish you would give more coverage is public domain/shareware.

Robert Pearson
Indiana, PA

No Answer

IN HIS JANUARY '90 editorial ["Chief Concerns," p. 6], Doug Barney writes that ". . .there is a new crew at Commodore that is spending big bucks and doing some really smart things." Why then, if they are so smart, can I not obtain a reply to my letters to them?

I am employed by Northrop Corporation in Hawthorne, California, where we are evaluating PCs to determine where our next machines should come from. We currently operate a mix of IBM PC-ATs and Apple IIs. I visited the local Amiga dealer, who could not answer our detailed questions and recommended that we contact Commodore. We wrote Commodore a letter and enclosed a list of questions about the Amiga. To my great surprise, I received my letter back with some penciled comments—no letter or signature. To this day I do not know who answered the questions. To clarify things, I called Commodore and was passed to several departments, but no one claimed knowledge of my letter.

I sent the whole package to the President of Commodore. No answer! I also forwarded to them information of a newly formed government/academic/industry group that is going to develop a NASA design program for use throughout the aerospace industry, which would give the Amiga access to a much wider user base. Once more, no answer.

Northrop is a large user of computing equipment, and is wary of companies that do not respond to its requests for information. This looks like another lost opportunity for the Amiga. It doesn't matter how good a machine is if those who are trying to sell it do not know how to do so.

Brian G. Wilson
Los Angeles, CA

Rational Argument

DOUG BARNEY'S February '90 editorial ["Chief Concerns," p. 6], which promises less stereotyping and a more rational form of Amiga advocacy, is a dramatic and welcome change from the tone of previous editorials. Picking up the multimedia ball and publishing addresses where Amiga users can direct comments, complaints, and suggestions is a positive use of time and energy. Keep it up!

Julie Petersen
Bellingham, WA

What Was the Name of That Computer?

COMMODORE'S seven-page Amiga ad on pages 43 through 49 of your February 1990 issue was the worst advertisement of a product I have ever seen. It violates every rule that a good hard-hitting advertisement would follow. The product name is buried in copy; the superfluous personality photos are a waste; there is no emphasis on price as compared to the competition; and there are no lists of specs. Not one piece of pertinent information is given to the potential buyer.

A good advertisement containing the essential information for *all* Amiga models could be condensed to one page with color. The words AMIGA and COMPUTER should be the first words to catch the reader's eye. This could be done without clutter and superfluity.

No matter how good a product is, if you can't market it successfully, forget about being successful.

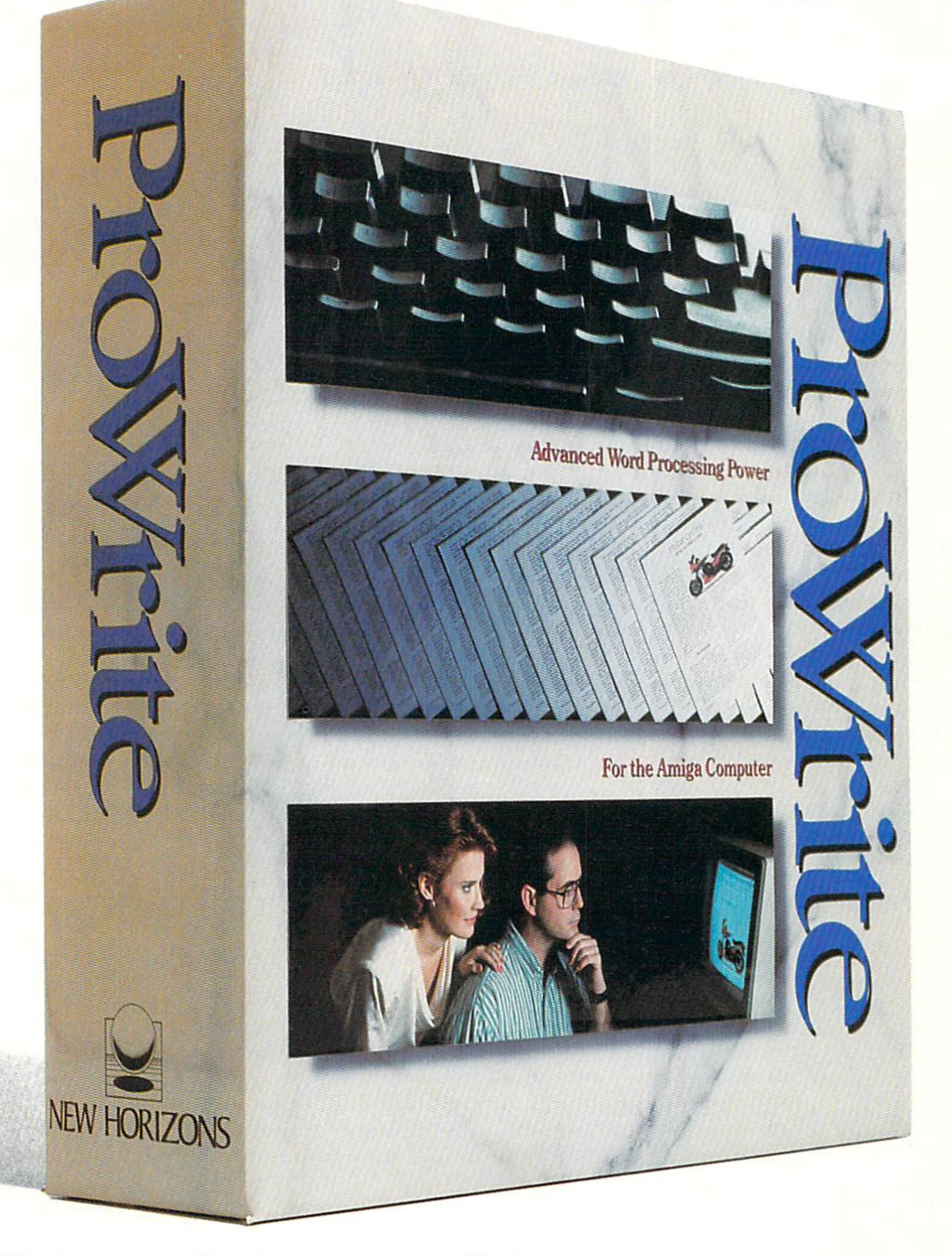
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You could write to Commodore. . .but how about trying the agency that created the ads? They are also responsible for the TV commercials starring "Stevie Palmer." Here's the address; let them know what you think:
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They are also interested in learning of other creative uses of the Amiga. You can send disks or printouts of your artwork, music, graphics, etc. to the above address (however, they cannot return your materials).

—Editors

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NOTEPAD

Compiled by Barbara Gefvert Tyson

Public Relations

ALTHOUGH THE AMIGA is a favorite tool for many artists, finding a large display of Amiga art at a public gallery is unusual. Laurence Gartel's Nuvo Japonica (New Japanese Imagery) exhibit at the Joan Whitney Payson Gallery of Westbrook College in Westbrook, Maine marks the first time a professional artist has had a showing of work produced entirely with the Amiga.

Not only is this event exceptional, it's also controversial. Laurence addresses the current strain in relations between American and Japanese cultures with a no-holds-barred approach that prompts thought and discussion. Established icons such as geisha girls and Godzilla represent the Japanese, and Gumby, Mr. Potato Head, and a Ken doll portray American interests.

Like many Amiga artists, Laurence relies heavily on digitization. His primary tools, in addition to his A1000, are NewTek's Digi-View digitizer and DeluxePaint III (Electronic Arts). "For the money," says Laurence, "the Amiga is the best system. I feel much more fluid with this machine [compared to a Macintosh]." Laurence does most of his work in low resolution (320 × 200). According to Judith Sobol, director of the Payson gallery, "people get too hung up about resolution. The pixels add a tremendous amount of vitality."

The Nuvo Japonica series is not yet available in book form, but the just-released **Laurence M. Gartel: A Cybernetic Romance** (published by Gibbs M. Smith Inc.), a computer-art anthology spanning 15 years, includes a number of pieces created with the Amiga. Among these is the first computer art print to be included in the Smithsonian American History Museum collection. What advice does this successful artist offer those of us just starting out in Amiga graphics? "Take a picture, scan it or use a tablet to trace it, and then modify it in different ways. . .that's a good starting point."



East meets West in Laurence Gartel's dynamic Nuvo Japonica series.

—Graham Kinsey



NAMM the Torpedoes!

AT THE JANUARY National Association of Music Merchants (NAMM) show in Anaheim, CA, Commodore announced a dealer promotion good through March 30 (to take advantage, you must have the coupon slated to appear in national music magazines). For the usual price of an A2000 with monitor, dealers will offer an A2000, 1084 monitor, and MIDI interface, along with three Dr. T's programs: KCS 3.0, Copyist Apprentice, and any Caged Artist librarian. Commodore is also working on a new MIDI standard that allows memory-resident sequencers and librarians to communicate, and to use a single machine's serial ports. Preliminary specs go something like this: Sequencers using the same serial port for MIDI will be able to merge data, while those using different ports at the same time will allow 16 discrete MIDI channels per serial port. Resident sequencers will also be able to share timing information.

Steinberg of W. Germany announced beta testing of PRO-24 (MIDI sequencing software acclaimed on the Atari) for the Amiga. Passport Designs will bring Master Tracks Pro Amiga up to the version now out on the Macintosh. Dr. T's showed Tiger Cub, also in beta.

—Mitch Wells

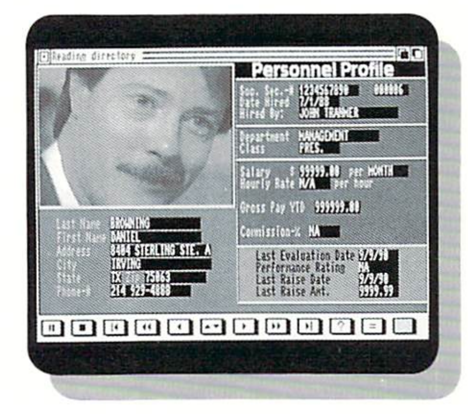
The revamped Commodore Education Program provides for a territorial distribution network and competitive pricing. Bundles are priced for institutions, students, and educators at up to 55% off ($799 for an A500 with external drive, 1 meg RAM, and monitor; $3679 for an A2500/30, Bridgeboard, and monitor) and stand-alone products are discounted 30%. To penetrate the market dominated by Apple and IBM, CBM plans to target the segment "ready to upgrade," and to ride the multimedia wave.

If you support computer graphics education, you can apply for an ACM SIGGRAPH grant exceeding $1000. The 25 grants include participation in the international SIGGRAPH conference in Dallas, August 6–10. Applications must be postmarked by April 2; for details contact G. Scott Owen, Math and Computer Science Dept., Georgia State U, Atlanta, GA 30303, 404/651-2247. *—BGT*

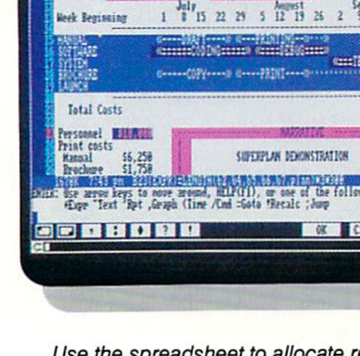
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REVIEWS

ANIMagic

An Anim editor for all reasons.

By Gene Brawn

THEY HAVE NAMES like Mirage, Abacus, and Pinnacle. Swooping titles, glowing graphics, and dramatic zooms are just a small part of their repertoire. These effects, and the hardware used to create them, are known as Digital Video Effects (DVEs). They are the hottest thing in the video universe.

ANIMagic is an ambitious effort to bring the full power of a studio DVE to the Amiga by simulating its effects with IFF animations (Anims). Originally envisioned by Gary Bonham (the father of IFF Anims) as an all-purpose animation editor, ANIMagic ultimately grew to include an impressive suite of digital effects. Flips, zooms, tumbles, confetti, page turns, venetian blind, and mosaic-style transitions are available with just a few clicks of the mouse.

After several sessions with the program, my report card is in and the grades are mixed. ANIMagic gets high marks for its power and flexibility but comes up short on speed of execution and ease of use. Although its potential is mouthwatering, putting it to practical use is another matter.

DIGITAL EFFECTIVENESS

ANIMagic's library of video effects includes over 20 "basic" routines for producing complex DVEs using any type of graphics, from titles to full-motion animations. According to the manual, at least 9025 variations are possible for each effect. Some of the more impressive include page turns, rotating boxes, and opening "doors." Many of these effects are three dimensional, meaning that the graphic objects' backsides appear when they are rotated. Additionally, you can customize and save these files by selecting parameters from the nifty pop-up menu buttons.

The Grid Control menu is the most powerful and complex part of the DVE. If you modify an effect, this is where you will spend most of your time. From here you control the size of the grid, the point of origin of the effect, the path the effect will follow, and its duration. If the effect is in three dimensions, you can use the 3-D High Level Control menu to change the distance of the object from the viewer and determine whether the back of the image or another picture is mapped to the back of the effect. With the Backdrop Control you create a colored background for the effect, add shadows to moving objects, and change the size and screen location of the source and destination images.



For a seasoned underwater video producer who is a computer novice, ANIMagic is easy to use. Even beginners can perform a multitude of tasks, but unfortunately the manual is written for an experienced audience.

—Joe Kentz
Tuscon, AZ

Although substituting a software Anim for a real-time hardware DVE is certainly cheaper, there are some major disadvantages. First, the files are usually huge. This is not a problem if all you want is a title for a video (as long as you have enough memory to load the animation), but such files are probably too large to be included in longer disk-based animations or demos.

Also, while high-end effects machines operate in real time, ANIMagic does its stuff frame by tedious frame. The you-get-what-you-pay-for caveat applies; in ANIMagic's case, you pay in lack of speed. As an example, I used ANIMagic to create a simple 66-frame animation. The task involved superimposing a 32-color Anim, frame by frame, on a HAM (Hold And Modify)-format background of the same resolution (low). The frames were rendered to hard disk in four hours, 40 minutes. For comparison, I rendered the same frames with DigiPaint (NewTek), automating the process with an ARexx script. It took about two hours, including script writing.

ANIMagic's rendering speed may or may not be cost-effective for you. Many other programs, among them The Director (Right Answers Group) and DeluxeVideo III (Electronic Arts), can do very simple effects in real time, and if your needs are simple these may better serve you. Thankfully, Aegis anticipated professionals' needs and included a program version designed for use with 68020/68881 accelerators.

LEARNING THE TRICKS

At first, I was pleasantly surprised by the interface. From the buttons to the text, the design appears simple and uncluttered. The main display is divided into two parts, with editing controls in the upper half and the DVE section below. Two thoughtful touches are especially welcome: pop-up menu buttons and the ability to hide unneeded parts of the control panel.

Unfortunately, my euphoria lasted no longer than the first few clicks of the mouse. The novice ANIMagician (experienced Amiga user or not) faces a formi-

dable learning curve. Invoking almost any effect, however simple, requires that you specify at least five or six parameters. Confusion mounts when you try to locate the controls to set; they are scattered all over the program. Fortunately, pressing the Help key turns the cursor into a question mark. Place the cursor over any key and press the left mouse button to summon a detailed description of the key's function.

I found the main control panel confusing and poorly designed. Animation playback is controlled by clicking on buttons arrayed in two horizontal rows at the top of the screen. The upper row resembles the controls on a VCR: You play, rewind, fast forward, and single step through the animation by clicking on them. The problem is that the layout is inefficient. If you want to single step forward, you must click a button on the right side of the screen. To reverse direction, you have to traverse the entire screen and click a similar button at the left. These buttons should be side by side.

The icons on the buttons are too spartan and repetitive to be of much help to the novice or casual user. The identity of a button is often dependent on its location rather than its design. This was extremely confusing to me, and I found myself constantly reaching for the Help key.

Another major annoyance is the lack of keyboard equivalents for menus and gadgets. ANIMagic's control panel can cover half the screen, obscuring much of the display. To step through an animation and inspect each frame, you must advance the frame using the control panel, turn the panel off to see the frame, switch back to the control panel, and so on.



The might and muscle of Digital Video Effects—brought to you by ANIMagic.

Under the Editor's Spell

The editor is my favorite part of ANIMagic. It can add, delete, insert, and cut and paste frames to an existing animation. Special goodies include the ability to change a frame's palette and timing within an animation. Color cycling and variable transparency are also supported.

The palette tools are some of the best I have ever used. With them you can automatically create a smooth transition between palettes over time, or blend, merge, and smear as many as three palettes in order to create an optimized color scheme.

All of the editor's tools work with single frames or any specified range of frames. Best of all, versions 5.40-2 and newer of the ubiquitous ShowANIM (which is included) support the on-the-fly frame changes implemented by ANIMagic.

As good as it is, ANIMagic cannot automate the creation of an animation from a file of IFF pictures. This is a glaring omission. If you need to assemble an Anim from more than a few frames, I suggest you do so using Electronic Arts' DeluxePaint III (for up to 64 colors) or MicroIllusions' Photon: Cel Animator (for HAM), then modify the result with ANIMagic.

> ***YOUR TURN!***
>
> With ANIMagic, someone who is a video pro but a computer novice can run an animation through DVE and achieve wild results. It would be better, however, if you could run the animations from within the program rather than from the CLI.
>
> ***—Bill Reichle***
> *Long Beach, CA*

Best Witches

ANIMagic's manual is skimpier than I would like. The emphasis is on tutorials, which are straightforward if not lengthy, and the index is complete. I wished for a reference section, though.

The program is not copy protected and hard-disk installation is a breeze. I especially like the Project Information window, which lets you tell ANIMagic where to look for the files it needs to play your animation. As a bonus, the program will create a custom icon that sets these paths before the animation runs. The Information Window is also used to select the Anim-compression scheme. Amiga IFF Vertical Byte, XOR, and two MAC II schemes are but a few of the compression formats supported. ►

ANIMagic crashed several times while I was testing it, most seriously while I was saving a file to disk. This could have been much worse had I been using a hard disk instead of a floppy—the file was open when the system reset. When I tried to use the disk again I got an AmigaDOS validation error and had to use DiskSalv to recover it.

ANIMagic is one powerful program, able to leap multiple transitions in a single bound. However, I question its complications. In a professional situation, one might use the software a few times a month—too infrequently enough to become expert. There are just too many inconsistencies and eccentricities in ANIMagic for it to be comfortable for the casual user. Then there is the issue of speed.

On the other hand, if you need an all-purpose ANIM editor, take the time to learn ANIMagic. It does so many things no other program can, that I find I *must* use it, despite my reservations.

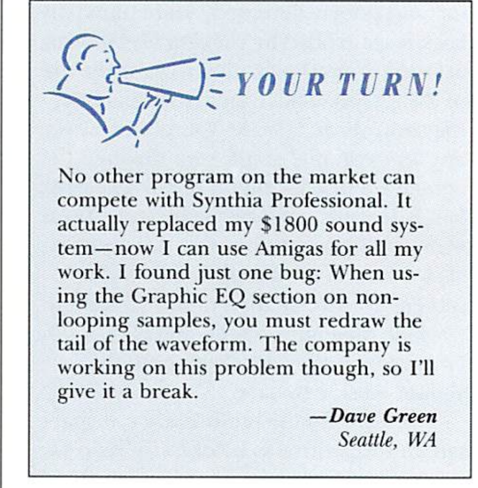
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SYNTHIA PROFESSIONAL

Synthesize in 16 bits.

By Steve Quinzi

PEOPLE THINK OF samplers primarily as a means of creating acoustic-instrument sounds. This is certainly valid, as extensive load-and-play libraries of string, woodwind, brass, and percussion sounds are available for many models. But samplers need not be relegated to such traditional, mundane duties; they can be used to generate exotic synthesized sounds created by one or a number of synthesis techniques. All you need is a program capable of producing these sounds and putting them into a format your sampler can understand, and then transmitting them to the sampler for playback. Synthia Professional is such a program.

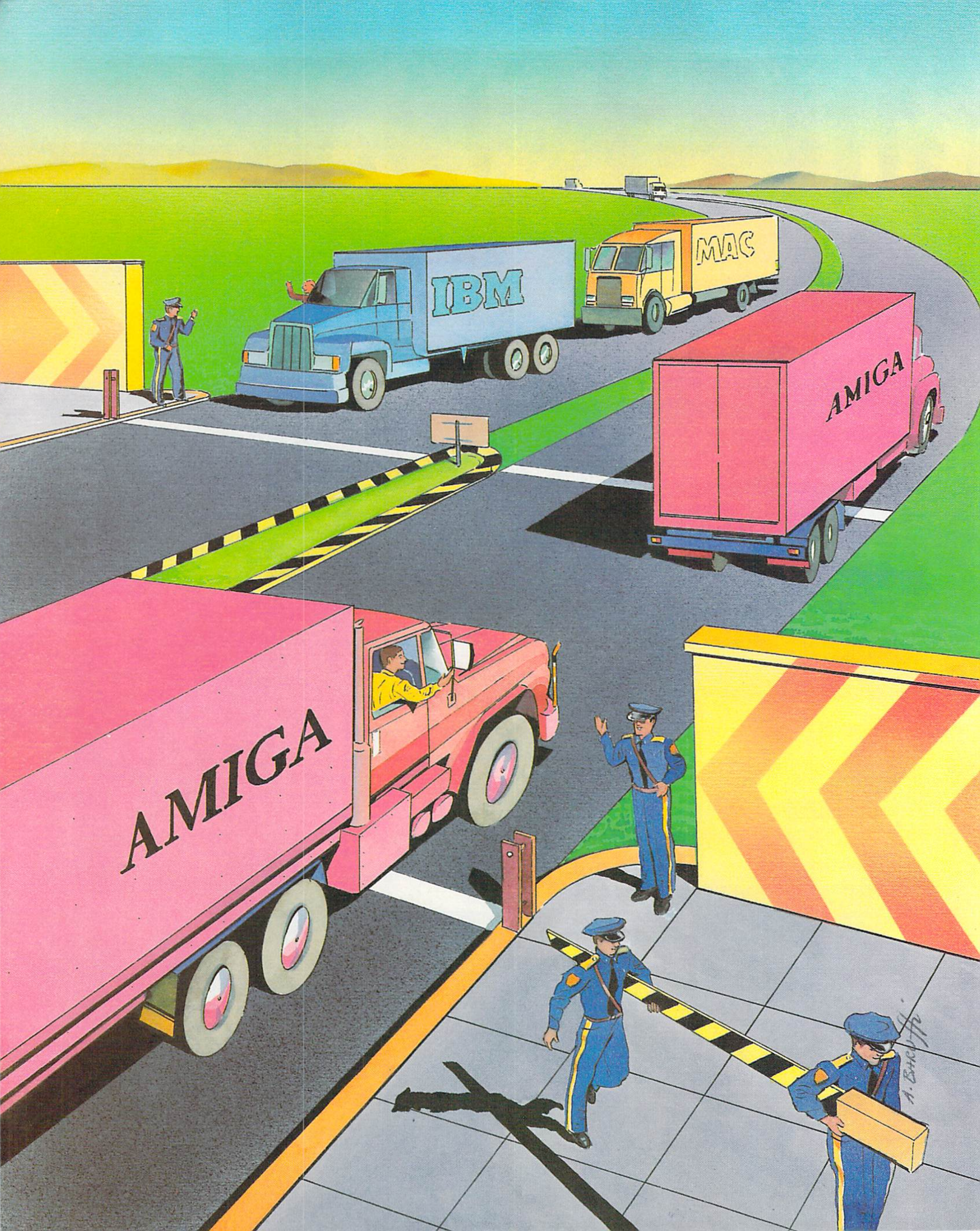


No other program on the market can compete with Synthia Professional. It actually replaced my $1800 sound system—now I can use Amigas for all my work. I found just one bug: When using the Graphic EQ section on non-looping samples, you must redraw the tail of the waveform. The company is working on this problem though, so I'll give it a break.

—Dave Green
Seattle, WA

Synthia Pro is billed as a 16-bit synthesizer, but it is not the real-time device we have come to know by that name. Unlike

Continued on p. 78


IBM
MAC
AMIGA
AMIGA

PRODUCTIVE COEXISTENCE

Improved communications between the Amiga and the IBM/Mac superpowers will mean bigger payoffs from your productivity software. Here's a quick course in products and protocols that will help you break down the barriers.

CROSSING BOUNDARIES—WHETHER international or intercomputer—used to be quite an ordeal. Now—like the lifting of the Iron Curtain or the crumbling of the Berlin Wall—barriers between AmigaDOS and the operating systems of the IBM PC and Macintosh are beginning to fall. While you still need the proper passport to get through, more and more productivity programs are speaking a common language to allow free exchange of information.

An emulator or conversion program that will translate files into AmigaDOS format is your passport for intercomputer travel. (See the sidebar "Slipping Across.") Once the data is on the proper type of disk, all you need to do is load it into your application program. Theoretically, if the program can read your file's format, you can load the information and start work immediately. More often, you will need to do a bit of data cleanup first.

To see how well the Amiga's word processors, spreadsheets, and databases met the ideal, I tested them with files from WordPerfect (WordPerfect Corp., IBM and Mac), FullWrite Professional (Ashton-Tate, Mac), Lotus 1-2-3 (Lotus Development Corp., IBM), and dBASE III PLUS (Ashton-Tate, IBM) as examples. (See the compatibility chart for a breakdown of the file-importation capabilities for each spreadsheet and database.)

WORD FOR WORD

Unless your Amiga word processor comes in a version for the IBM or Mac, you cannot transfer documents among machines without losing special font formats, margin settings, and so on. The standard procedure is to save your document in text (ASCII) format, copy it to the required computer, and load the document into the new word processor. Although it sounds simple, it is not always straightforward. While KindWords (The Disc Company, $99.95) loaded transferred files cleanly, Amiga WordPerfect had problems with text formatting, mainly because of inconsistent margin settings. Experiment with widths and your documents should look fine. On the first try, ProWrite's (New Horizons Software, $124.95) problems were more severe; imported documents were badly formatted and littered with extraneous characters. Hold down the Alt key while you load the file, and the results will be much more satisfying.

You will encounter a similar situation when importing text that was created on a Macintosh. While the Mac allows more than 80 characters to a line of text (because of different sizes of fonts), Amiga word processors expect a maximum of 80 characters per line. When creating a document on a Macintosh for use later on an Amiga, remember to keep the characters to 80 or fewer per line. A spacing of 12 characters per inch on the Mac usually works best.

You will also usually lose the original document's special paragraph formatting (indentations and so on) in the conversion. Visually the document will appear to be indented, but if you try to make some additions to the text, you will discover the indentations are filled with spaces rather than tabs or the originating program's indentation character.

Occasionally, conversion programs insert an LF ►



BY TIMOTHY TRIMBLE

ILLUSTRATED BY ANDREA BARUFFI

(Linefeed) or CR (Carriage Return) at the end of each line. To realign your paragraphs, delete the space or return character at the end of each line and let the word processor reformat the line to the correct size.

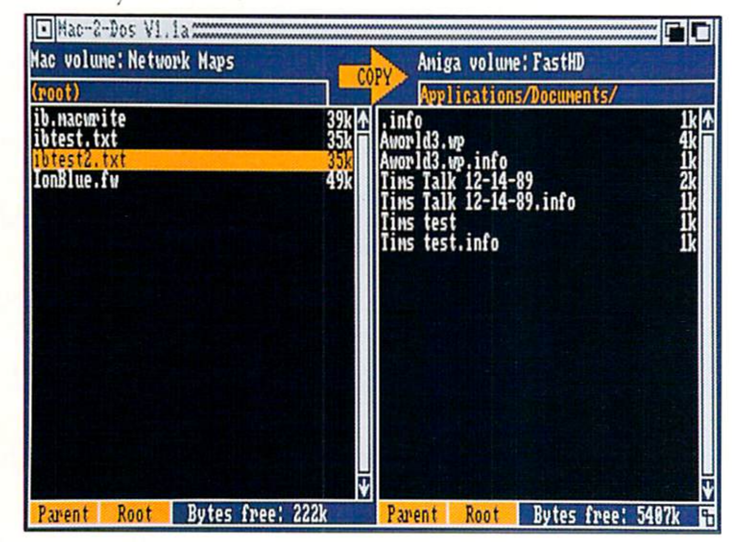
When transferring files between versions of WordPerfect, simply select the type of file you wish to import (Text, IBM 4.2, or IBM Text) from the Import menu, then select the drive, directory, and file from the Retrieve File window. I could see no difference between the Text and the IBM Text import; perhaps the latter option converts the CRLF of the IBM text to LF. This is already done, however, when you move the file from MS-DOS to AmigaDOS. The only problem I ran into was that Amiga version 4.1 was not able to read files from Macintosh version 4.2. Files transferred between Amiga 4.1 and PC 4.2 hit no such roadblocks. Line formatting and font instructions survived the conversion.

Lotus Position

While there is no official standard format for spreadsheet data files, the Lotus 1-2-3 format (.wks files) is the most widely used. The four programs supporting Lotus on the Amiga are, with one exception, very reliable. You will find that you might have to adjust column sizes in the imported files, but that is about all. Even a large, macro-filled spreadsheet that I brought from the office worked fine.

Sticking to the Amiga's Intuition, Analyze! (Micro-Systems Software, $99.95) uses menu controls. Simply select Archive from the Worksheet menu, then 123 for the file type, and finally specify the filename.

Superplan (Precision, $149.95) and VIP Professional (ISD Marketing, $99.95) take similar keyboard-based approaches to importing. In Superplan, press / for the Selection menu, L for the Load menu, then select your file format (Superplan, dBASE, Lotus 1-2-3, Logistix, Comma Separated Values, Text, or DIF) and file name. A straight clone of Lotus, VIP uses standard Lotus commands (/ for Selection menu, F for File menu, R for Retrieve) and lacks Amiga amenities. If you are a heavy Lotus user, VIP is your best choice. Be warned, however, the program can read only Lotus files.

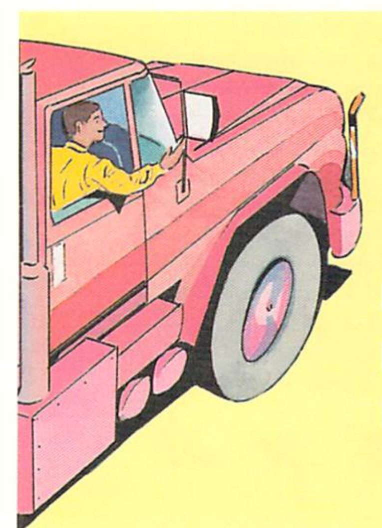


With Mac-2-DOS, you can point and click your files between formats.

The strongest warning comes with MaxiPlan (Intuitive Technologies). I was unable to make the current version (1.9) load anything but its own files, even though it comes with a separate program for converting file formats. I hope Version 3.0 ($249.95), which should be shipping by the time you read this, will correct the problem, because MaxiPlan is a great spreadsheet to work with on its native files.

For the Record

In the database field, dBASE has achieved the same status as Lotus 1-2-3 has for spreadsheets. The dBASE file format (.dbf files) is widely supported on the Macintosh and PC. On the Amiga, your choices are►



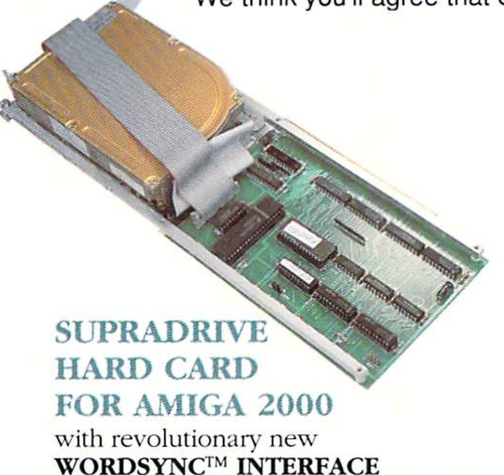
Compatibility Chart

Program	ASCII files	Lotus files/macros	Comma Delim. files	dBASE files	dBASE programs
Analyze!	N	Y	N	Y	Y
SuperPlan	N	Y	Y	Y	Y
PVIP	N	Y	Y	Y	Y
MaxiPlan 500	N	N	N	N	N
Superbase Pro.	Y	Y	Y	Y	Y
dBMAN V	Y	N	Y	Y	Y

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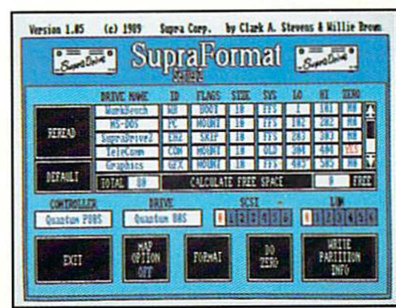
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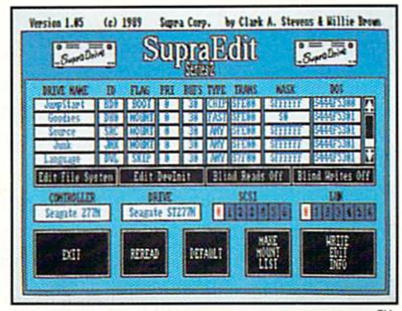
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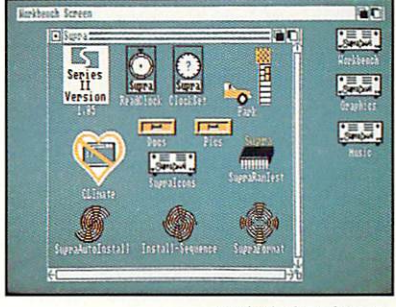


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Slipping Across

BECAUSE YOUR AMIGA cannot read IBM or Macintosh files directly (or vice versa), you must translate the desired files to the proper disk format before loading the data into your applications programs. For IBM conversions, your best bets are Commodore's emulators, the A2088D (for PC/XT files, $699.95) and A2286D (for PC/AT files, $1599) Bridgeboards. With these computers-on-cards you can not only transfer files between operating systems, but also run IBM programs from MS-DOS on your Amiga.

The transfer procedure is quite simple. In the PC window, double click the PCDisk icon, which tells the Amiga to open a gateway between the Bridgeboard and the Amiga for file transfers. Access the Bridgeboard side of the Amiga and, from DOS, use the Awrite.exe file to move your file from the IBM disk to the Amiga disk. For example:

AWRITE A:MYFILE.WKS DF0:MY-FILE.WKS /B

copies a file called myfile.wks from the disk in drive A: to the internal Amiga floppy drive. The /B option flag is very important; it tells the Amiga to keep the full binary structure of the file. Without it, the Amiga will treat the file as if it were made of text only and will not copy it properly.

To copy a file from the Amiga to a DOS disk, follow the same steps, but use Aread.exe to move your file. For example:

AREAD DF0:MYFILE.WKS A:MY-FILE.WKS /B

copies myfile.wks from the Amiga's DF0: to the DOS disk in drive A:. As before, the /B option flag is very important.

Two other option flags are also available: /NC and /CR. When you specify /NC, the Bridgeboard does not convert MS-DOS special characters to their Amiga equivalents. Because the Amiga uses a different ASCII-extended character set from the IBM PC, /NC could lead to unwanted results. Without this flag, the Bridgeboard converts the MS-DOS special characters to their Amiga-DOS equivalents automatically. The /CR option flag disables the conversion of CRLF (carriage return/line feed) into just LF. Most IBM PC word processors will place a CRLF at the end of each line, whereas the Amiga only uses an LF. If you use /CR and /NC together, the effect is the same as using the /B option flag.

While unchallenged in the emulator market, the Bridgeboards do face a rival for file conversion. DOS-2-DOS (Central Coast Software, $55) is a low-cost, software-based alternative to emulator boards. It reads and writes 3½-inch and 5¼-inch (you provide the drive) IBM disks and can transfer files in ASCII or binary format. Like the Bridgeboards, it converts CRLFs into LFs. Just because it is an Amiga product, do not expect an Intuition interface; you will need to learn some simple keyboard commands to run it.

To Mac and Back

To move files from Macintosh disks to the Amiga, I use DOS-2-DOS' cousin, Mac-2-DOS (Central Coast Software). The program comes with ($349.95) or without ($99.95) a 3½-inch external disk drive and a cable to attach it to the Amiga's floppy-drive connector. Quite easy to use, Mac-2-DOS employs two windows to display file directories for the Amiga disk and the Macintosh disk (see photo). Menus and gadgets make moving files between Macintosh and Amiga disks much easier than with the Bridgeboards. Click on the desired directory, then on the file you wish to transfer. Pull down the Conversions menu, select the proper transfer format, and click on the Copy arrow.

With Mac-2-DOS you can convert binary, text, PostScript, and even MacPaint file formats. The Binary option works well when moving WP (WordPerfect), or GIF (Graphic Interface Format) files because these can be used directly by other Amiga products after only minimal format conversions. Do not use Binary to convert Lotus 1-2-3 files; it renders them unreadable. The only option that can handle Lotus 1-2-3 format files correctly, No Conversion works well for transferring files that can be used in the same binary format on the Amiga as on the Macintosh.

The Text option works similarly to the Bridgeboards' /CR option flag, by converting a CRLF into an LF for use on the Amiga. The PostScript option is unique in that it supports the transfer, but not the conversion, of EPS (Encapsulated PostScript), a new form of PostScript that includes a bitmap graphic image within the PostScript file. Because EPS is not currently supported on the Amiga, the file is converted "as is," which still allows for use of the ASCII-based PostScript commands within the file. Whether future Amiga products will support the Macintosh "flavor" of EPS is not known.

Mac-2-DOS' MacPaint-To-IFF option allows easy transfer between the two graphics-file formats. It takes black-and-white 576×720-pixel MacPaint images and converts them into black-and-white 640×720-pixel IFF duplicates of the original.

If you need to run Mac-specific programs or just feel more comfortable with an emulator, A-Max (ReadySoft, $199.95) is your only choice. The hardware portion plugs into the drive port and offers pass-through for an external Amiga drive plus a port for an Apple-compatible drive. The core of A-Max is the Macintosh ROM chips, which you must purchase separately ($50 for 64K chips, $150 for 128K). While not essential, an Apple-compatible drive ($150–$200) smooths transfers from the Mac to A-Max. The Mac/Amiga file-transfer utility merely passes the data and does not convert between file formats. With A-Max, you are better off doing your homework in Mac mode than ferrying it to the Amiga. □ *—TT*

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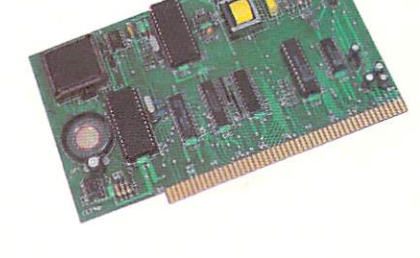


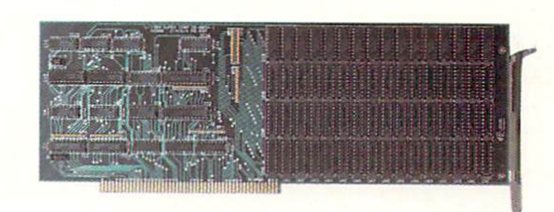
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limited to Superbase Professional (Precision, $299.95) and dBMAN V (VersaSoft, $295). The two programs import files equally well, but take different approaches. In Superbase, you highlight Import in the Process menu, click on the appropriate format (dBASE II, dBASE III, ASCII Delimited, ASCII Fixed Length, DIF, and even Lotus 1-2-3 and Logistix/ Superplan), and then select the file to import. Using a mix of typing and clicking, dBMAN requires you to enter "assist" at the CMD: prompt, click on Open A Database from the File menu, and specify the file to load.

Going one step further, dBMAN V supports the execution of dBASE-type programs and applications. If you have a dBASE application you use on the Mac or PC, you can also use it on your Amiga. As a test, I created an application in dBASE III on an IBM and converted the files. Via standard dBASE commands issued at the CMD: line, dBMAN V ran the application and used the database files without requiring any file-format conversions.

Intelligence Report

While you can swap files between machines and applications, compatibility standards could still be improved. A standard format for word processing, beyond the vanilla-text ASCII, would be a good start. I would like to see a full standard that supports WYSIWYG (What-You-See-Is-What-You-Get) word processing and desktop publishing. A strong beginning, PostScript could be used as a platform for allowing compatibility of files from the Amiga, IBM, and Macintosh.

A more radical wish is for an across-the-board standard for disk formats. With all our high technology, we are still reduced to converting files from one disk format to another by using telecommunications, networks, and special add-on devices. Maybe the increased use of optical disks for storage will bring about such a file-storage standard.

Until that time (if ever), differing hardware platforms and formats are a way of life. The key to success is to be conversant in several. With the Amiga's flexibility, work that used to require running two, sometimes three, different computers, now requires only one. The next challenge is to make the business world take notice. ■

Timothy Trimble is a technical manager at Ashton-Tate and a freelance writer. Write to him at 6034 Pacific Coast Highway, Apt. 9, Redondo Beach, CA 90277 or via electronic mail on CompuServe to 76306,1115.

Manufacturers' Addresses

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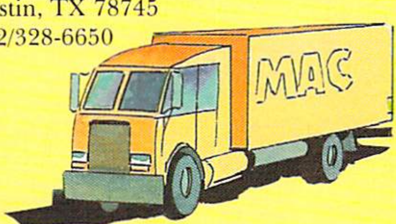
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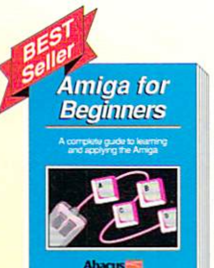


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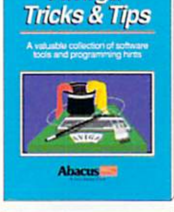
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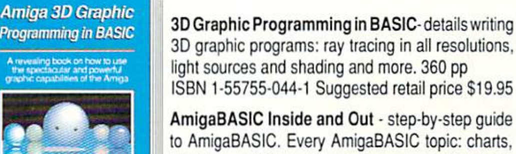
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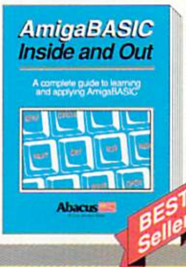
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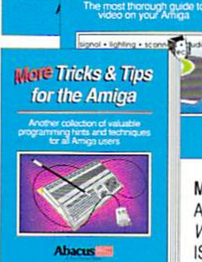
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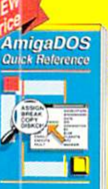
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The Great Software Weigh-In

How do you get maximum productivity from your multitasking Amiga? Well, like a manager training his boxers, you need to know your software's physical attributes—the programs' true fighting weights, best combinations of punches, and different capacities for punishment.

By Loren Lovhaug

If you were managing the US Olympic boxing team, it would not do you much good if you had four great heavyweights but no real strength in the other eight or nine weight classes. You need balance and a team that demonstrates overall ability. The same holds true for getting the most out of your productivity software on your multitasking Amiga. Find programs that work well together, that do not make excessive demands on your system's chip RAM, and that do not waste valuable system resources performing operations they were not designed to execute effectively in the first place.

To help users put their most "productive" team on the canvas, we have conducted this "Great Software Weigh-In" to provide some important vital statistics on memory usage concerning over 50 popular programs covering a wide range of categories. In so doing, we believe we can help Amiga owners who want to multitask their programs decide which applications best fit their needs and system resources, and how certain combinations of programs might work most effectively together.

To make better use of the information in the "Great Software Weigh-In" charts that follow, we need first to know a little about how Amiga multitasking works, some basic distinctions between the kinds of memory your system contains, and a few helpful hints on conserving valuable memory resources.

If you want to multitask several programs, obviously you must have the system resources to run each of those programs. In nearly all cases, the limiting factor as far as such resources are concerned is the amount of random access memory (RAM) available when a program is launched. Knowing *exactly* how much memory a program requires is crucial for multitasking. Unfortunately, magazine advertisements, software packaging, and even software reviews seldom make this clear. They may tell you whether a program requires a 512K or a one-megabyte system to run that individual program, but that's all. For instance, two programs that actually use 520K and 850K of RAM, respectively, both require an Amiga with at least a megabyte of RAM—period. Simple ►



ILLUSTRATED BY JEFFREY SMITH

mathematics, however, will tell you that the implications for multitasking with these two programs are vastly different.

FROM RAMS TO SHEEP. . . AND BACK AGAIN

Forsaking our earlier, more muscular boxing metaphor, let's take our cue from George Bush and seek a "kinder, gentler" analogy to better understand the way memory limitations affect the Amiga's multitasking capability: Think of the Amiga as an old-fashioned Village Common, where all of the shepherds in the village come to graze their sheep. Each program represents a shepherd and his hungry flock utilizing the same grassy knoll, the Amiga's RAM. Having more RAM in your Amiga makes it possible to invite more shepherds to feed their flocks, and likewise larger flocks to visit the pasture. Keep in mind, however, there is always a finite limit to how many flocks can use the pasture at any one time.

Our multitasking Common differs markedly from the situation that exists with other popular, non-multitasking computers. If a program takes several hundred acres of RAM on a single-tasking computer but does not exceed the total available memory, no one cares; in fact, it is almost a programmer's duty to make use of every spare byte available in order to enhance the performance of the program. A single-tasking computer is much like a private estate where the landowner has no need to consider the well-being of other shepherds because they are not allowed to graze their flocks on the estate in the first place. Under the Village Common system, however, a citizen who fences off all of the pasture for his own grazing purposes would be considered rude and selfish, and would soon be visited by the sheriff. On the Amiga, visits from the sheriff for memory-hogging behavior come in the form of insufficient memory warnings from "well-behaved" programs (those that can share the system with other tasks without taking over the entire machine), or a system crash in the case of the ill-mannered ilk (those, like many games, which do take over the whole system).

Leaving our multitasking sheep for the moment, let's get back to the RAMs—or, more precisely, the different types of RAM found inside most Amigas. "Chip RAM" refers to the first 512K of RAM (or the first one megabyte for those with the latest One-Meg Agnus chip—see the sidebar "More Chip on Your System's Shoulder"). It is called chip RAM because this segment of the Amiga's RAM is directly addressable not only by the Amiga's 68000 microprocessor, but also by its three coprocessor chips. These custom chips relieve the 68000 of much of the responsibility for managing various input/output tasks and also control sound and graphics activities (which include, as well, such functions as manipulating windows, updating screens, operating pull-down menus and custom screens, and so forth). This makes chip RAM inherently precious, as the data for nearly all graphics and sound functions ultimately must be stored in chip RAM for the Amiga's custom processors to have direct access to them. Regardless of whether you have even eight megabytes of total system RAM, when your 512K (or one meg) of chip RAM has been exhausted, ►

More "Chip" on Your System's Shoulder

IF YOU WORK with—and especially if you want to multitask with—programs that are graphics- and sound-intensive, the new One-Meg Agnus chip will be invaluable in providing your system with an extra 512K of chip RAM.

Installation requires modifications to the Amiga's motherboard, plus the delicate removal and insertion of chips. Play it safe and have a registered service center do the work. The upgrade typically costs between $150 and $175 for the chip and installation.

If you bought your Amiga after June 1989, however, it may already have the new Agnus chip. You can test for its presence in an A2000 or A2500 with the Avail command. From the CLI or Shell type AVAIL. If you have a megabyte of chip RAM, the third item (in the Maximum column) in the first row (marked "Chip") will read 1040152. If not, the number will be half as great.

The situation is trickier for A500 owners. To determine whether you have the new Agnus chip, you must open the computer. (If you have it, you will see only four RAM chips on the motherboard instead of 16.) Because the A500 comes with only 512K of memory, the computer is set at the factory for 512K of chip RAM. Even if you have the One-Meg Agnus and plug in a 512K expansion module, the RAM will not become chip RAM automatically. Your dealer must make internal modifications to the A500 before it will recognize the extra RAM as true chip RAM. Once the modifications are made, the computer will not operate unless the memory-expansion module is plugged in.

As of this writing, A1000 owners have no direct upgrade path to one megabyte of chip RAM, because the first Agnus chip is smaller than the new chips. A few third-party developers are working on adaptors that will allow the A1000 to accept the One-Meg Agnus. It has been reported that Greg Tibbs has developed one such board called The Rejuvenator. Expert Services (5912 Centennial Circle, Florence, KY 41042, 606/371-9690) will market it and promises a Spring release. Word has it that The Rejuvenator will be priced between $500 and $600 and will come fully populated with the One-Meg Agnus and 1MB of RAM. □

—Sheldon Leemon

your Amiga cannot open more screens or windows—which means no more new programs—even though you still have plenty of non-chip RAM available.

This non-chip RAM, called "fast RAM," can only be accessed by the main processor. Not having to be shared among the custom processors does provide some great advantages (it speeds program execution by relieving the strain on chip RAM during heavy graphics activity, letting the main processor access program instructions from it while the graphics chips are using chip RAM). But the fact remains that it cannot hold graphics and sound information and thus you will still have problems trying to multitask graphics- or sound-intensive programs. (For a more detailed explanation of the different types of memory and the various kinds of RAM contained in your Amiga, see Sheldon Leemon's "Memory To The Max" in the December '89 issue.)

CONSERVE THAT CHIP RAM!

No matter how carefully you select programs that might multitask well together based on our "Weigh-In" charts, the fact remains that chip RAM is still a precious resource. Some tips on minimizing the drain on your system's chip RAM in general will help you use the information in the charts even more effectively.

When the Amiga's operating system has a choice as to where it can store data, you definitely want it to put data in fast RAM instead of chip RAM. You can easily make this preference known by including the command "FastMemFirst" in your Amiga's startup-sequence. Another conservation method is to change the kind of display screen your application uses to display its data. Many programs contain menu items called "configuration" or "preferences" where you are presented with a number of screen-display options. These choices may include the number of colors in your screen display, the screen resolution (hi-res, lo-res, interlaced, or non-interlaced), and whether your application runs on the Workbench or on a custom screen. In addition, some programs include what are known as "startup options," which might involve changing the tool-type entry on a program's icon or providing additional information when a program is invoked from the CLI. In such cases, careful study of your program's documentation can save you an immense amount of chip RAM. In general, here are some guidelines on how various types of screen-display options affect chip RAM usage:

Chip RAM is a precious resource: Whenever you have a choice, store data in fast RAM instead of chip RAM.

1. Reducing the number of colors (bitplanes) an application uses for displaying information greatly reduces the amount of chip RAM used by the application.

Although the use of color in some applications is crucial, others, such as word processing, do not really benefit from additional colors. In many cases, these extra colors are used simply to create "shadow effects" on windows and gadgets—which may be attractive but are extraneous to the functionality of the program.

2. Low-resolution screens take up less chip RAM than high-resolution screens.

In general, 320-pixel wide (lo-res) screens conserve more chip RAM than 640-pixel wide (hi-res) screens, provided you are using the same number of colors. For instance, a multicolor 320-pixel screen will exhaust more chip RAM than a monochrome 640-pixel screen. Likewise, non-interlaced screens (200-line) are more efficient than interlaced (400-line) screens—with the same caveat as far as the number of colors used.

3. Running programs on the Workbench screen is generally more efficient than running a program on a custom screen.

When you have a choice, running applications on the Workbench screen will save you chip RAM (with a few exceptions noted below). This is true because the Workbench screen is normally always present in addition to, as opposed to instead of, any custom screen you might be using. Keep in mind, however, that the Workbench screen is a four-color screen, so if you use an interlaced Workbench screen, a two-color lower-resolution custom screen may be more efficient than a program running in a large window on the Workbench screen. Also important here is that although they may be more efficient chip RAM users, some applications—in particular those involving the manipulation of multiple windows—may run considerably slower and be more cumbersome to use on the Workbench screen.

With these conservation tips in mind, you're now ready to move on to our Weigh-In proper and a wealth of vital statistics on some of your favorite Amiga programs. (See "Software Weigh-In Stats," beginning on p. 30.)

WEIGHING UP THE RESULTS

It is important to understand that a program should never be judged solely upon its memory usage; instead, memory usage should be considered as a primary factor in determining relative worth after considering the program's performance and cost. After all, a memory-efficient program that does not do what you want it to do is no bargain.

continued on p. 37

SOFTWARE

Weigh-In Procedures

THE WEIGH-IN TESTS were conducted on an Amiga 2000 with five megabytes of RAM and an A500 with one megabyte. All programs were tested under a stock, "no-frills" copy of AmigaDOS version 1.3, loaded from floppy disk. Workbench was loaded as part of the startup-sequence. Although the Amiga 2000 was equipped with a hard drive, it was not mounted or used in order that we could ensure consistency throughout the tests. As a prelude to each test we opened two CLI windows. With the first CLI we checked RAM usage with the AmigaDOS AVAIL command, while we used the second CLI to start the program being tested.

Before each program was tested, and between each individual test, we soft-rebooted AmigaDOS using the Control-Amiga-Amiga key combination to make certain that none of our data was corrupted by applications that might fail to return portions of memory back to the operating system either when the program was exited or when applications data was discarded. Although this was a time-consuming process, it proved the best way to avoid misleading results owing to memory fragmentation or improper programming practices. After each reboot, the results of the AVAIL command were recorded before any application or its data was loaded. The program was then launched from the second CLI window. Once the program was finished loading, we again checked the AVAIL command in the first CLI window. At this point we calculated the "opened" values by subtracting the figures recorded once the program was loaded, from the memory figures recorded just after the soft reboot but before the program was loaded.

Within some categories of applications, we tried to test each program using a variety of data, because there is often a significant difference in memory usage depending on the type of data handled by that group of applications. The goal here was to provide a better insight into the memory needed for each program while it was in use, rather than merely recording how much memory it consumed when loaded in an "empty" state. In all cases where programs are tested with data, we ran the tests by loading the data in the program's own internal data format, as opposed to testing the applications immediately after importing the data from another format. (Some programs allocate extra memory during the importation process.) To do otherwise would unduly penalize those programs that included extensive built-in importation modules for their flexibility; importing data from a foreign format is not necessarily representative of normal operation.

Finally, all programs were tested in their "default" configurations, as they are shipped from the manufacturer. In cases where the default configuration was unusually inefficient in comparison to other programs in the same category, we also tested the program using a more efficient configuration. The point of this entire exercise is to help you multitask more effectively, so programs with the ability to configure themselves in more efficient forms should not be penalized for offering you that very choice. We did not, however, test all programs in their absolutely most efficient configuration. For instance, some of the desktop-publishing programs offer non-interlaced screen options, but as most users opt for the interlaced mode, we used interlaced screens to test these programs.

—LL

Key To Chart Abbreviations

Product — ***WP Lib*=WordPerfect Library utility**

Company — ***PD*=*public-domain program***

Screen — ***WB*=Workbench screen**; ***CS*=custom screen**; ***CSI*=custom screen interlaced**; **[*Number*]=number of colors**

Weigh-In Stats

Word Processors and Text Editors

Each of the following word processors and text editors was tested without any test loaded into it (Open), with a 5904-byte file (Small) representing a typical three-page letter, and a 92,589-byte file (Large) representing a typical 35-page document. Memory usage differences among the programs can be accounted for by the kinds of display screens they use and by the way each progam handles text formatting internally.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)								
				Open			Small			Large		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
WordPerfect	WordPerfect Corp.	WB4	4000	62	162	224	62	198	260	62	295	357
Transcript	Gold Disk	WB4	4000	60	131	191	63	154	217	63	248	312
TransEdit	Gold Disk	WB4	4000	48	89	136	51	102	153	50	198	248
More	(on Workbench 1.3)	WB4	4000	1	18	18	1	19	19	1	19	19
Pen Pal (80%)	Brown-Wagh	CS8	4000	174	1947	2121	174	1945	2119	174	1940	2114
Pen Pal (10%)	Brown-Wagh	CS8	4000	174	515	690	174	511	686	NA	NA	NA
Pen Pal (80%)	Brown-Wagh	CS8	4000	329	305	634	329	307	636	NA	NA	NA
ProWrite (MR)	New Horizons	CS8	4000	50	245	296	51	262	313	51	470	521
ProWrite (HR)	New Horizons	CSI8	4000	97	248	346	98	267	365	98	505	603
excellence!	Micro-Systems	CS8	16384	95	410	504	95	419	513	95	569	664
excellence!	Micro-Systems	CS2	16384	35	410	445	35	419	454	35	569	604
PEdit (WP Lib)	WordPerfect Corp.	WB4	4000	51	166	216	51	166	217	51	264	316
MEMACS	(on Workbench 1.3)	CS2	4000	16	75	91	16	83	99	16	207	223
Scribble	Micro-Systems	WB4	4000	34	143	178	34	143	178	34	252	287
TxEd Plus	Microsmiths	WB4	4000	1	68	68	1	74	75	1	159	159
QED 1.9	PD	WB4	4000	30	67	97	33	90	123	30	211	241

NOTES

1. Pen Pal has an unusual buffer allocation scheme that allows you to specify a percentage of your available fast RAM for buffer space. Given this arrangement we felt compelled to test Pen Pal in three different configurations. The 80% and 10% tests were conducted on an A2000 with five megabytes of RAM. The 80% w/ 1MB test (third from the top) was conducted on an A500 equipped with one megabyte of RAM. The complete Large test file would not load during either the 10% 5MB test or the 80% 1MB test.
2. Both Gold Disk and New Horizons provide two different versions of their programs (Transcript and ProWrite, respectively), so we tested both versions. TransEdit is a fully functional version of Transcript without Transcript's printing capabilities. ProWrite MR functions on a 640 × 200 pixel custom display, while ProWrite HR functions on a 640 × 400 pixel custom display.

Spreadsheets

Each spreadsheet was tested without any data loaded into it (Open), as well as with a 4073-byte (Small) spreadsheet, and with a 31,039-byte (Large) spreadsheet loaded into it. Both the large and small spreadsheet files featured a liberal mixture of formulas and numeric and text data, as well as a number of empty cells as one would find in most spreadsheets. Differences in memory usage can be accounted for by the kind of display screen utilized, as well as by how each spreadsheet stores its cell data, in particular how empty cells are stored.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)								
				Open			Small			Large		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
Superplan	Precision	CS8	20000	48	506	553	49	516	565	48	542	590
VIP Professional	ISD Marketing	WB4	4000	41	777	817	41	777	818	41	777	818
Analyze!	Micro-Systems	WB4	15000	25	238	263	25	239	264	48	542	590
MaxiPlan 1.9	Intuitive Tech.	CS8	4000	52	205	257	69	241	310	NA	NA	NA

NOTES

1. VIP Professional provides a configuration option allowing you to allocate a fixed amount of RAM that you wish to dedicate as buffer space. In our tests we needed a 512K buffer to load our Large spreadsheet, so we used the 512K buffer for both the Small and Large tests, even though we could have done the Small test using a smaller buffer.

2. MaxiPlan's external file-conversion utilities would not allow us to import our Large spreadsheet file correctly. When we used the .WKS (Lotus 1-2-3 standard), the conversion utility designed for that purpose crashed about two-thirds of the way through the conversion. We tried converting the Large file in small chunks as well with the same result. We were able, however, to convert the Large file as pure text (no formulas), but as this is not an accurate representation of a spreadsheet we decided that using the large data as text was inappropriate.

Databases

Each database program was tested before any records were accessed (Open) as well as when accessing a 100-record database (Small) and a 1560-record database (Large). Each record in both of the latter databases was made up of seven text fields of various lengths and two numeric fields. In those programs that provided multiple index support, we used only a single index for continuity. The differences in memory usage can be attributed primarily to how each program holds and accesses records. For instance, both Superbase Professional and Pro DataRetrieve normally access a single record at a time and provide a user-definable record cache, which was set to 10 records on each program, whereas Microfiche Filer Plus holds the entire database in memory. One approach is no more valid than the other, but it is important to note the difference when examining the results below.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)								
				Open			Small			Large		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
Microfiche Filer Plus	Software Visions	CS2	4000	62	194	256	65	234	299	64	669	733
Superbase Pro 3.01	Precision	WB4	8000	33	349	382	34	351	385	33	351	385
Pro DataRetrieve	Abacus	CS4	4000	43	346	389	43	380	423	43	380	423
Organize!	Micro-Systems	CS4	10000	38	203	241	38	209	247	38	214	253
dB Man	VersaSoft	CS2	11000	16	537	553	16	540	556	16	538	554

Paint Programs

Each paint program was subjected to a maximum of four different tests. The first records the memory usage of the programs upon initial startup without any data (images) loaded into them. The other three tests involve the loading of different types of IFF image data. The Lo-Res results derive from loading a 320 × 200 pixel, 32-color image, while the Hi-Res results derive from loading a 640 × 400, two-color image. The final test involves the use of the Amiga's HAM (Hold-and-Modify) mode with a 320 × 400 HAM image for those programs supporting HAM. For those that do not support HAM but do support EHB (Extra_Halfbrite) mode, we tested a 320 × 400, 64-color EHB image.

Product	Company	Stack	Memory Consumption (Kilobytes)														
			Open			Lo-Res			Hi-Res			HAM			EHB		
			Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
Digi-Paint 3	NewTek	4000	94	281	375	95	287	381	NA	NA	NA	157	335	492	NA	NA	NA
Deluxe PhotoLab	Electronic Arts	4000	126	281	408	127	283	410	156	280	436	262	288	550	NA	NA	NA
DeluxePaint III	Electronic Arts	4000	147	247	394	147	247	394	132	247	379	NA	NA	NA	262	247	510
DeluxePaint III (overlay)	Electronic Arts	4000	147	184	331	147	184	331	132	184	316	NA	NA	NA	262	184	447
Photon Paint 2.0	MicroIllusions	4000	142	388	530	142	388	530	NA	NA	NA	236	452	688	NA	NA	NA
Photon Paint 2.0 (overlay)	MicroIllusions	4000	142	324	466	142	211	353	NA	NA	NA	236	275	511	NA	NA	NA
DeluxePaint II	Electronic Arts	4000	110	166	277	110	167	277	118	167	285	NA	NA	NA	NA	NA	NA
DeluxePaint II (overlay)	Electronic Arts	4000	110	123	233	113	122	236	118	122	240	NA	NA	NA	NA	NA	NA
PIXmate	Progressive Per.	4000	66	121	187	42	124	166	32	122	155	97	122	219	NA	NA	NA
Butcher	Eagle Tree	4000	110	110	220	110	110	220	93	110	203	220	110	330	NA	NA	NA
SuperView II	PD	4000	NA	NA	NA	41	14	55	32	13	46	96	14	110	NA	NA	NA

NOTES

1. Both DigiPaint 3 and Photon Paint 2.0 are HAM paint programs. These programs will, however, load 32-color lo-res images, so we tested them with the Lo-Res graphics data. Photon Paint and DPaint II and III have an option allowing you to conserve memory by using disk-based overlays as opposed to loading the entire program into memory. Therefore, we opted to test the programs in overlay mode separately. SuperView II, of course, cannot edit the pictures it displays, but is included for comparison basis as an example of a small utility that can display pictures.

Desktop Publishing

The desktop-publishing programs were tested in two states: without any data loaded into them (Open) and with a typical three-page layout (Layout) incorporating the Small text file used in the Word Processors tests above and the 640 × 400, two-color image used in the Paint Programs tests. Differences in memory usage are primarily owing to the way each program handles text and graphics data internally, as well as to the actual program size itself.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)					
				Open			Layout		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
PageSetter	Gold Disk	WB4	4000	69	125	194	89	145	233
PageStream	Soft-Logik	CSI4	4000	117	305	422	118	363	481
City Desk 2.0	MicroSearch	CSI4	4000	80	370	450	83	442	525
Pro Page 1.3 (Color)	Gold Disk	CSI16	4000	321	357	678	321	442	763
Pro Page 1.3 (B&W)	Gold Disk	CSI4	4000	227	357	584	227	442	669

►

Telecommunications

We tested the telecommunications packages only in their "Open" state, namely, without having text in their capture buffers and without using such special features as macros and terminal-emulation modes, because there was no consistent manner in which to compare the actual memory usage of these features. Each program, with the exception of Access, came configured with a 16-kilobyte capture buffer. Interestingly, the telecommunications packages as a group were by far the most flexible packages in terms of configuring screen display. Therefore, we made an effort to test the three commercial telecommunications programs (A-Talk III, Baud Bandit, and Online!) not only in their default configurations, but also in their most memory-conserving configuration.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)		
				Open		
				Chip RAM	Fast RAM	Total RAM
A-Talk III	Oxxi	WB4	4000	89	195	284
A-Talk III	Oxxi	CS2	4000	80	200	280
Baud Bandit	Progressive Per.	CS8	4000	128	106	234
Baud Bandit	Progressive Per.	CS2	4000	47	103	150
Online!	Micro-Systems	CS8	4000	48	277	324
Online!	Micro-Systems	CS2	4000	16	277	293
JR Comm	PD	CS2	4000	21	198	219
Access 1.3	PD	CS4	4000	97	128	225

Personal Information Managers

These programs represent a group of utilities focused on keeping track of calendar events, phone or address lists, and personal scheduling. Inherently more valuable as multitasking applications, most of these programs allow themselves to be tucked away as a very small window on Workbench. PIM applications were tested in both their small iconified windows (Icon) and in their "open-for-business" states (Open). As we would not dare estimate how many friends you have or how busy your business calendar might be, all programs were tested without adding additional data.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)					
				Open			Icon		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
NAG Plus 3.0	Gramma	WB4	4000	29	96	125	4	92	96
Calendar (WP Lib)	WordPerfect Corp.	WB4	4000	41	104	145	3	101	104
W!W!W!W!	Blue Ribbon Bakery	WB4	4000	29	164	193	10	164	173
Mail-O-Dex	American Software	WB4	40,000	12	94	106	NA	NA	NA
Notebook (WP Lib)	WordPerfect Corp.	WB4	4000	51	110	161	9	110	119

NOTES

1. Mail-O-Dex has no small-window/iconify option and no appointment-reminder function. Its default stack as shown above is not a misprint, but even with this large stack it remains a memory-efficient program. The WordPerfect Library collection of utilities separates the tasks of calendar watching and schedule planning (handled by Calendar) and mail/phone list keeping (Notebook) into two programs, which we tested separately. W!W!W!W! is Who! What! When! Where!.

BBS Software

We tested the two leading commercial Amiga bulletin board programs—MicroSystem's BBS-PC and Incognito's Atredes—in their empty, "default" (Open) state without actually setting up a real bulletin-board system complete with message bases and file-transfer areas. We did this because the way each of the two programs sets up a BBS configuration is vastly different. We also added an entry for Atredes' memory-conservation iconify mode (Icon).

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)					
				Open			Icon		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
BBS-PC	Micro-Systems	CS4	15000	47	241	288	NA	NA	NA
Atredes	Incognito	CS8	20480	64	262	325	1	260	261

DOS Shell Programs

These handy utility programs offer many functions, including the ability to move, copy, and rename files and directories with the click of a mouse. More relevant to our tests here, they often allow the display of text and graphics files. The Small and Large categories show the memory usage of these programs as they display the same text files used in the Word Processors section above; the Lo-Res, Hi-Res, and HAM columns show the memory consumed in displaying the same pictures used in the Paint Programs tests. Fm (File Manager), one of the programs included in the WordPerfect Library collection, does not include the ability to display picture files.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)								
				Open			Small			Large		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
CLImate	Progressive Per.	CS8	4000	118	70	188	175	70	246	175	70	246
DiskMaster	Progressive Per.	CS8	4000	90	49	139	90	65	154	90	150	240
Fm (WP Lib)	WordPerfect	WB4	4000	50	73	123	94	81	175	94	165	259

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)								
				Lo-Res			Hi-Res			HAM		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
CLImate	Progressive Per.	CS8	4000	158	100	258	150	99	250	213	100	313
DiskMaster	Progressive Per.	CS8	4000	90	49	139	90	49	139	90	49	139
Fm (WP Lib)	WordPerfect	WB4	4000	NA	NA	NA	NA	NA	NA	NA	NA	NA

Music Programs

Unfortunately, newer Amiga music programs have not continued to support the SMUS file standard, complicating our ability to compare the following programs. All programs were tested with their default song-editor screens opened (Open), as well with them playing music. Because Sonix and Deluxe Music Construction Set (DMCS) can play SMUS format files, the same song (a 32-bar, four-voice tune) was used with each program's default instrument voice. Music Mouse creates its own music algorithmically "on the fly" as it runs. We stepped out of our consistent pattern and tested M with a music file not usable with the other programs—a short MIDI file included on the program's disk.

Product	Company	Screen	Stack	Memory Consumption (Kilobytes)					
				Open			Play		
				Chip RAM	Fast RAM	Total RAM	Chip RAM	Fast RAM	Total RAM
DMCS	Electronic Arts	CS8	16000	319	205	524	319	208	528
Sonix	Aegis (Oxxi)	CS4	4000	82	38	120	82	40	122
Music Mouse	Aesthetic Engin.	CS8	4000	112	76	188	112	76	188
M	Intelligent Music	CS8	4000	62	298	360	110	354	464
M	Intelligent Music	CS4	4000	43	295	339	110	354	464

NOTES

1. M allows its screen to be configured for four or eight colors, and we tested both. Interestingly, the manual reveals that M's master-control screen mask is a standard IFF graphics file, the ultimate in end-user screen configurability!

Manufacturers' Addresses

Abacus
5370 52nd St. SE
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175 Duane St.
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Gold Disk
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Mississauga, Ontario
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416/828-0913

Gramma Software
17730 15th Ave. NE, Suite 223
Seattle, WA 98155
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Incognito Software
34518 Warren, Suite 149
Westland, MI 48185
313/937-1850

Intelligent Music
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Albany, NY 12206
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800/344-2086

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distributed by American Software

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408/723-9044

WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
801/225-5000

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Taking care to choose the right program for a specific task can greatly increase your ability to multitask other applications. For instance, the highly useful DOS shell program CLImate (see DOS Shell Programs chart) may be a good choice when you want to clean up your disks or reorganize your directories. As a utility to view text files or show pictures, however, it is terribly inefficient. This is not to suggest that you should not use CLImate to examine text or pictures: There are many instances when it is quite convenient to be able to do both of those tasks while using a DOS shell. But using CLImate to view a text file with a machine containing only 512K of chip RAM means you will be sacrificing almost half of that precious commodity, thereby severely limiting your ability to multitask other programs. Many full-fledged word processors will take up less RAM, and if you use a file reader such as More (see Word Processing and Text Editors chart), you will barely tax your resources. The same holds true for viewing picture files: Even DeluxePaint III actually uses *less* chip RAM to view a 640×400 monochrome image than CLImate. Using a simple public-domain program such as SuperView II (see Paint Programs chart) would save you hundreds of kilobytes of RAM and still accomplish the same task.

It is also interesting to note that much of what has been published or informally spread around about the memory costs of Amiga programs has been vague, unquantified, and in many cases inaccurate. Some programs tagged as "RAM hogs" are actually not when you look at them objectively in context with other programs used for the same task. For instance, WordPerfect (see Word Processing and Text Editors chart) has an undeserved reputation as being excessively RAM-intensive because of its extensive number of features, but in reality it tests out to be a near-average consumer of RAM in relation to other Amiga word processors. I hope this article will dispell some of this kind of "folklore" and prompt you to test some of your own convictions about various programs against the data presented here. Doing so will help put you on the road to more productive, effective multitasking. ■

Loren Lovhaug is a frequent contributor to Amiga and C-64/128 publications, and often reviews productivity software for AmigaWorld's *Reviews section. He is also a SYSOP on both the Quantum Link and GEnie telecommunications networks. Write to him c/o* AmigaWorld, *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

Casting A Wider Net

Commodore is fishing new waters with Unix,

but will you really share in the catch?



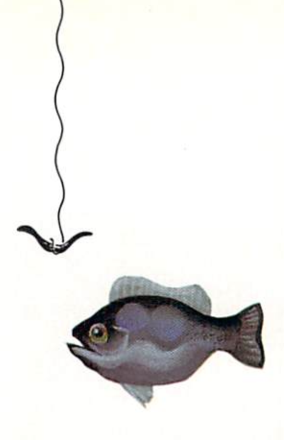
WHY DO I need a multitasking, multiuser operating system when I have AmigaDOS?" Amiga owners have been asking themselves this question since Commodore began showing Unix running on the Amiga at trade shows over a year ago. With the lure of networking, high-end CAD and desktop-publishing programs, and office applications, Commodore is dangling some enticing bait before business and professional users in the hopes that Unix will create new markets for the Amiga. The rest of us, however, may well wonder just what Unix is and what it can do for us. To answer those questions, we must start with some background about Unix.

Classic Preparation

AT&T's Bell Laboratories developed Unix for Digital Equipment Corporation's PDP-7 and PDP-11 minicomputers and began selling the source code in the early 1970s. By selling the source to universities for a nominal fee, AT&T helped Unix quickly become a ►

By Bill Catchings and Mark L. Van Name

ILLUSTRATED BY FRED LYNCH



de facto standard at many schools. Because Unix is written in C (developed by Bell Labs at about the same time), it is, as operating systems go, fairly easy to move to new machines. While most of the early ports were to minicomputers, today Unix is widely available on microcomputers with both Motorola 680x0 and Intel 80x86 CPUs.

As various groups ported Unix to new machines, different versions naturally sprang up. Several emerged as standards: AT&T's System V, Berkeley Unix (the basis for Sun Microsystems' SunOS), and Xenix, perhaps the most popular implementation for Intel processors. Fortunately, the versions are similar enough that experienced users can move from system to system with little trouble.

Unix's original set of tools was good and it has only grown richer with time. Today the operating system supports a wide variety of languages, programming libraries, and networking protocols.

Unix excels in networking and was the platform ►

Computer du Jour: Amiga Unix

WHILE THE STATE of the general Unix world is complicated, at least it is largely a matter of public record. That's not yet the case with Commodore's Amiga Unix. Because this article precedes the official product announcement, Commodore representatives were not eager to divulge many details. Combining the information they did supply, recent third-party announcements, and our knowledge of other Unix versions sketches the following picture.

Commodore will initially sell Unix as part of a new Amiga (the A3000 is the most likely candidate) that you will be able to buy with either Unix or AmigaDOS. The new machine will be based on a Motorola 68020 or 68030 CPU running at 16MHz.

You will also probably be able to run this Unix on current Amigas, although Commodore was very noncommittal on this point. Don't, however, expect to run Unix on your A500; the operating system typically requires at least 2MB (preferably 4MB) of memory and at least 40MB of disk space.

You need not worry about obsolescence; Amiga Unix will be the latest and greatest version (AT&T's System V.4), not an about-to-be-out-of-date relic. System V.4 is the culmination of AT&T's effort to combine four key Unix versions: the company's System V, Berkeley's 4.2, SunOS, and Xenix. Amiga Unix will also include XWindows. In what company representatives called a "strategic endorsement of V.4," Commodore demonstrated an Amiga running System V.4 and XWindows in the AT&T booth at the Fall '89 Uniforum trade show. The Amiga version of XWindows was modified to use the Amiga's graphics chips to calculate and manage some of the graphics. The performance of this XWindows implementation should compare favorably with that of similar low-end Unix workstations. As an added attraction for those who need even higher resolution, Commodore showed Unix running at last winter's World of Commodore show with the company's new Hi-Res card, which is based on the TI34010 graphics processor. This as yet unreleased product promises a palette of 16 million colors and very high-resolution mega-pixel displays. To make use of all that display power, Amiga Unix will support Sun's Open Look GUI (see "A Look from Sun").

On the networking side, Amiga Unix will support the most common protocols, including uucp, TCP/IP, and NFS. The catch is that right now Commodore does not sell any networking cards for the Amiga. Expect some big Amiga networking announcements—probably for both Unix and AmigaDOS—from Commodore in the near future. While the Commodore spokespeople would not give us details, look for Ethernet hardware, because the TCP/IP and NFS protocols are almost useless without it.

Such a system, of course, does no good without applications. While some of the existing Unix/Open Look library theoretically should run or at least compile on Amiga Unix without alterations, Commodore is actively courting Unix application vendors, including most of the major players, for Amiga-specific versions. Commodore would not give us specific names, but such vendors as Informix and WordPerfect Corp. are obvious candidates.

Amiga Unix targets three main markets in which the Amiga's present penetration is low. The federal government, the largest Unix customer, tops the list. (Many government contracts require support for multiuser Unix.) Higher education and the general business community follow. Commodore is trying hard to make available the software that these markets require, and it is setting up marketing channels targeted for each of these areas. The Commodore spokespeople went to great pains, however, to explain that the firm is not abandoning AmigaDOS, but is instead trying to expand the system's overall market presence.

The ability to run a lot of existing Amiga applications under Unix would be nice, but this topic produced some of Commodore's quickest "no comment" answers. Long-standing rumors indicate that Amiga Unix might run "well-behaved" AmigaDOS applications that can share the system with other tasks and do not take over the entire machine. The Commodore representatives would say only that they have been "discussing" this issue. Our guess is that Commodore will provide at least some minimal, restricted facility for running Amiga applications. At worst, you will be able to partition your system's hard disk into Unix and AmigaDOS sections, so that both operating systems can use the hard disk, although not necessarily at the same time. □

—BC and MVN

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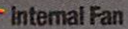
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for much early network development and research. Almost all Unix versions support at least the TCP/IP (Transmission Control Protocol/Internet Protocol) communications protocol. Most also support at least one network file system protocol; the two most common are Sun's NFS (Network File System) and AT&T's RFS (Remote File System).

While Unix has been a development environment for these and many other exciting technical projects, it still has the look and feel of a traditional minicomputer operating system. Each system needs an administrator. You don't just turn on the machine and use it; you must log in first. At the end of a session, you must shut the system down in an orderly fashion or risk losing disk files.

The interface typically has been a text-oriented command-line interpreter, a la the Amiga's own CLI. Different Unix versions sport different command-line interfaces, called shells (akin to AmigaDOS 1.3's Shell). The most popular are the Bourne, C, and Korn shells. All share one unfortunate trait: cryptic commands. Want to delete a file? Type **rm** (remove). What could be more obvious? The **mv** (move) command renames, **ls** (list) provides a directory listing, and **cat** (concatenate) displays a file. A few, such as **cd** (change directory), no longer seem cryptic because so many other operating systems now use them.



While vague, the commands do share a common benefit: Each is a separate tool that you can use in combination with the others. Like AmigaDOS, Unix lets you redirect the output of any program (and hence command) or send one program's output directly to another program via "pipes" (similar to the PIPES: device in AmigaDOS 1.3). The underlying notion is that providing many simple tools, with good ways to use them together, is better than having lots of options on each tool. For example, rather than add lots of sorting switches to the ls command, let the user pipe its output to a sort tool. Time has eroded this notion somewhat; ls, for example, now has many options.

Traditionally, your only interface for Unix was a command line, but the operating system is evolving here as well. An MIT graphics standard, XWindows, is becoming increasingly popular on Unix systems. XWindows defines all the primitives that application developers need to drive mega-pixel displays over networks. In keeping with the Unix philosophy, however, it does not define a standard graphical user interface (GUI).

Fortunately, market pressure is forcing Unix vendors toward standardization. In the last few years, all of the major Unix vendors have joined one or both of a pair of groups dedicated to standardizing Unix: AT&T and Sun started Unix International, while IBM, Digital, and others founded the Open Systems Foundation (OSF). Both are now discussing ways to bring their proposals together. The Unix world will benefit even if those talks fail, however, because the result will be at most two Unix standards—far fewer than the many that currently abound. The two organizations are also trying to provide standard GUIs. OSF's Motif ►

A Look from Sun

JUST BEFORE THIS article went to press, Sun Microsystems Inc. announced that Commodore will support Sun's Open Look graphical user interface.

Like the Amiga's Workbench, Open Look is mouse-driven and sports icons, pull-down menus, and point-and-click operations. The interface was tailored for Unix System V Release 4.0 (Unix 5.4) and will be supported by a broad range of software vendors, including Lotus Development Corporation. Open Look applications written for the Motorola 68000 family of processors and Unix 5.4 should run directly on Amigas, while many programs written for other architectures need only be recompiled to run on an Amiga.

The long-range impact of this announcement could be significant. With Open Look, Amigas will be able to take advantage not only of a number of sophisticated Unix programs already written for technical and productivity environments, but will also run those applications currently being developed by a broad range of vendors. Because of the failure of IBM and Microsoft's OS/2, many developers are shifting their efforts towards Unix. On the hardware side, Open Look supporters include AT&T, Amdahl, Fujitsu, Intel, Motorola, Olivetti, and Toshiba.

Commodore has yet to announce whether it will formally support OSF/Motif, a combination operating system/graphical user interface being pushed by Digital Equipment Corp., Hewlett-Packard, and IBM, among others. The point, however, may become moot. Although OSF/Motif has yet to ship, AT&T is working on an interface that would allow Open Look and Unix 5.4 to run OSF/Motif.

In other last-minute news, Commodore recently endorsed the 20MIPS Motorola 68040, a chip expected to be used by many Unix workstation vendors including NeXT Inc. The chip is promised to be shipping in volume by early Spring, with a 40MIPS version slated for release by year's end. Even if firms like GVP or IMtronics beat Commodore to the 68040 punch, this chip will surely liven the performance of any AmigaDOS or Unix-oriented system. □

—Doug Barney

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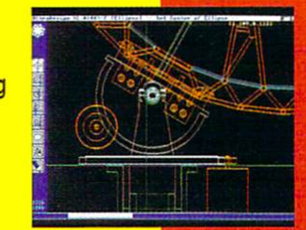
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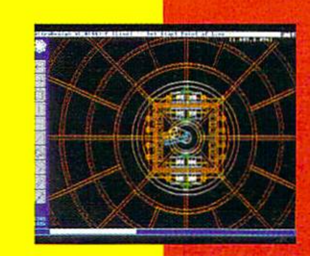
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and Unix International's Open Look are both icon-based GUIs that support mice. Commodore is siding with Unix International in designing Amiga Unix. (See "Computer du Jour: Amiga Unix" and "A Look from Sun" for more details on Amiga Unix.)

Make Your Choice

The question remains: Why would you ever want to run Unix? Its draws are multitasking, graphics, memory management, networking, and a wide variety of programming libraries and applications. These features should sound familiar: AmigaDOS already has all of them except for networking. While XWindows' graphics are good by Unix standards, they are not likely to impress many Amiga users. Unix also has few built-in facilities for taking advantage of two of the Amiga's greatest strengths: animation and sound. Unix does have some advantages over AmigaDOS. Its multitasking facility, for example, protects tasks from one another when you run on processors (such as the 68020 and 68030) that have memory-management coprocessors or features. Unix also supports virtual memory, which lets it run programs larger than physical memory by swapping portions of memory to disk when necessary. Most of all, Unix is better known and available on far more platforms than AmigaDOS.

The bottom line is that average AmigaDOS users will not want to bother with Amiga Unix, unless tempted by an irresistible, high-end application. It will not provide enough extras to be worth the money and hassle.

If you are already familiar with Unix and need a good, low-cost Unix system, however, Commodore's package will be attractive. It is the most current Unix version and should be priced "aggressively." Commodore is also an early participant in the GUI standard charge, strongly endorsing Open Look and the AT&T camp. The Unix command line and Open Look combination maintains the spirit of the Amiga's Shell and Workbench pairing, while promising to lead the machine into new and larger markets.

Even if you never want Unix, its availability on the Amiga is a good sign of the computer's maturation. Unix will open new markets for the Amiga and should lead to higher-capacity and higher-performance peripherals, something we can all use. Even if Unix does nothing but force Commodore to supply Ethernet boards for the Amiga, it will be a great boon. Whether you personally need Unix or not, its announcement should signal the start of an exciting year for the Amiga. ■

Bill Catchings and Mark L. Van Name are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Rd., Durham, NC 27703.*

UBI SOFT

Entertainment Software

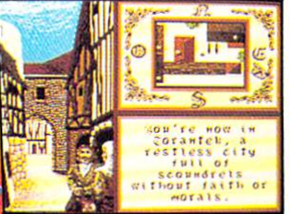
PRESENTS

THE WINNING TRIO

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ADVENTURE



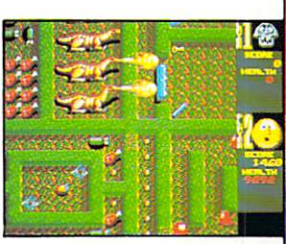


You are alone... a single warrior in a country of traitors, spies and assassins. You are unknown... the forgotten son of the dethroned king. Can you recover the throne ? Only a true Crusader of Justice could succeed at such a feat. Deceit and treachery abound !

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You owe it to your homeland. Your father, and most of all, to the future of your kingdom !

ACTION

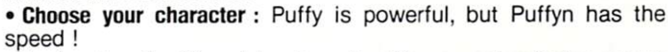




"DON'T GET PUFFED OUT...

That's the challenge in this addictive arcade-style game.

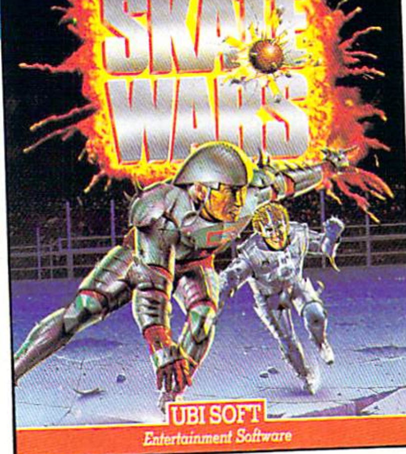
- **Avoid the enemies...** Ghosts, Acid Puddles, Flying Dragons, and Snakes lurk around each corner.
- **Choose your character :** Puffy is powerful, but Puffyn has the speed !
- **Explore twenty different levels** and settings, each offering secret passageways filled with demons.
- **Race through the mazes** quickly or accumulate points by exploring each level in full.
- **Enjoy** the colorful graphics and entertaining sound effects.



SPORT

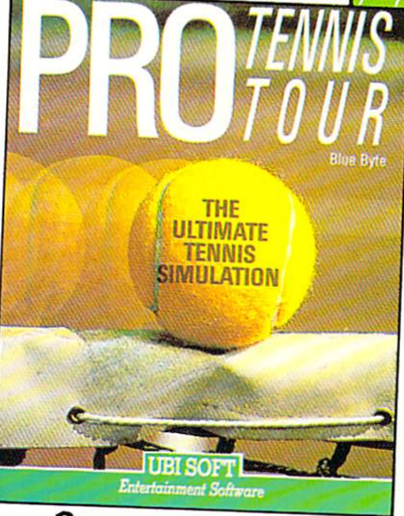




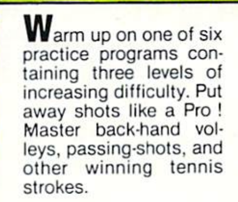


Skate Wars the sport of the future, combines the skills of soccer with the thrills of Rollerball, played in a space age ice stadium ! Lead your team to victory through a series of deadly hazards : crevasses, ramps, jumps, all while competing against the ruthless tactics of your opponents. You'll have to play dirty to win. Maim, trip, push, and shove... show no mercy. Only the brave win, or even survive !





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14

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

Freehand Animation

Part II: Ready For Action

IF YOU PASSED last month's "pencil test," you're halfway through our "MFA" course (mastering freehand animation) and should have a line animation of a character on an empty background ready to use in moving on to the final phases of the process. Having completed the drawing and testing segments—in which we learned how to use Deluxe-Paint III's (Electronic Arts) Fix and Free Background features to simulate an animator's light table—we focus this month on coloring, compositing elements, and post-production enhancement.

Before we start coloring with the Fill tool, let's first take a look at the palette. If you want the animated character to be in a painted or digitized scene, the palette colors of that IFF image will determine the palette for the character as well. Create such a background image as a separate IFF file and save it. If there are specific colors you want in your animated character—flesh tones, for example—build them into the background palette ahead of time. (See *Accent*'s "Forced Palettes" column, February '90, p. 70, for some extremely helpful techniques on digitizing a background.) Load the line animation from the Anim section of the menu, hit "j" from the keyboard to switch to the scratch screen, and load the background image to that screen. The animation palette will now be that of the background image.

COLORFUL CHARACTER

Switch back to the animation screen and see what color the lines of the animated character have become under the new palette. If you want to change the color of those lines, do it now—before coloring the image—by selecting the current line color as the background color, and the desired line color as the foreground color. Go to Change Color under the Picture menu and select BG > FG. The program will go through every frame automatically and change the background color to the foreground color without affecting the palette. Black lines are a good standby for line color, but gray or other colors can also be effective.

Color the animation with the Fill tool, "f" on the keyboard. Select each color for the character and fill the outlined areas frame by frame advancing with the 2 key. Finish with one color completely, then choose the next. For example, go completely through the animation with the flesh color, then choose a hair color and go through the sequence again. This method helps you track areas of color across a sequence of frames. When you are finished, run the animation with the 4, 5, or 6 key to evaluate it. When you are satisfied, save it to disk.

Now go to Anim Brush in the Anim menu and select Pickup. Make sure the background color is transparent, and hit SHIFT-1 to put you at frame one of the anim. As you would with a normal brush, drag a box around the entire character, leaving room for any movement there might be in successive frames. The entire animated sequence will be picked up as an anim brush with no apparent background. Save it under the Animbrush submenu.

Go to Frames under the Anim menu, memorize the number of frames in the Anim, then select Delete All. Hit the j key to switch to the background image on your scratch screen. Now return to Frames in the Anim menu and re-create the same number of frames. The background image is duplicated over the entire sequence. If you have not selected another brush in the meantime, the animbrush is still attached to the pointer. Set the animbrush to its first frame in Animbrush Settings and position it where you

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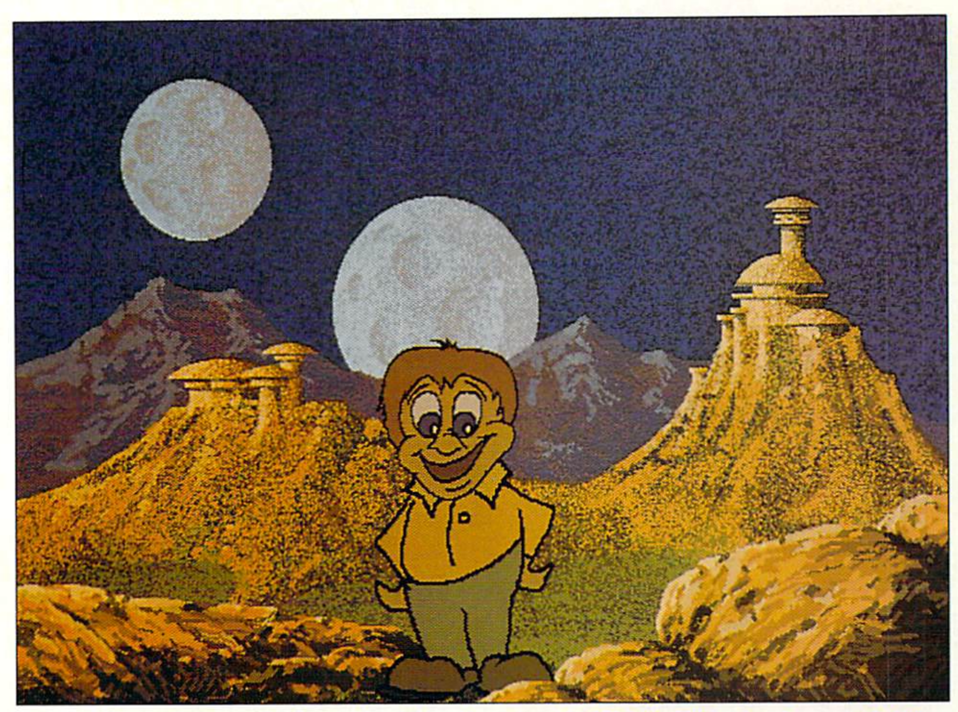
Put the finishing touches on your animation with these tips on coloring, compositing elements, and post-production enhancement.

want it on frame one of the anim itself. Take your hand carefully away from the mouse, leaving the brush in position. Hold down the "animpainting" key to the left of the space bar, and press the Left Alt key. This simulates pressing the left mouse button and stamps down successive frames of the animbrush frame by frame on the background in the animation. The advantage is that you run no risk of accidentally moving the mouse during the process.

Finishing Touches... Post-Production Frills

Play the animation to evaluate it. You have now composited one animation element with another. You can repeat the process indefinitely, building an animation in layers. At this point, you could decide, say, to add birds flying through the scene, put a border around the screen, or move clouds in the sky—all by creating those elements separately and compositing them into the animation as brushes. This is a powerful approach to animation, as well as an excellent use of the computer. Remember that the curve, freehand, and straight-line tools can also work across the entire sequence of an animation. To do this, go to the Spacing requester by clicking the right mouse button in an unfilled line tool. Select N Total and set it to the number of frames in the animation. On frame one of the animation, hold down the animpainting key and press the mouse button with the brush positioned at the desired starting point of a movement. Stretch the line to the desired end point and release the button. Each stamp of the brush will be on a successive frame, and the result will be a smooth, controlled brush or animbrush movement during the animation.

Your finished anim is only the starting point for the final phase of the process—post-production enhancement. You may want to turn to a program such as The Director (Right Answers Group) to, say, add sound effects, mouse or keyboard interactivity, or fading titles and credits. Perhaps you might chain multiple anims together, or experiment with effects requiring frame-by-frame control over anim playback. For instance, try reading in text from an external file for display during anim playback.

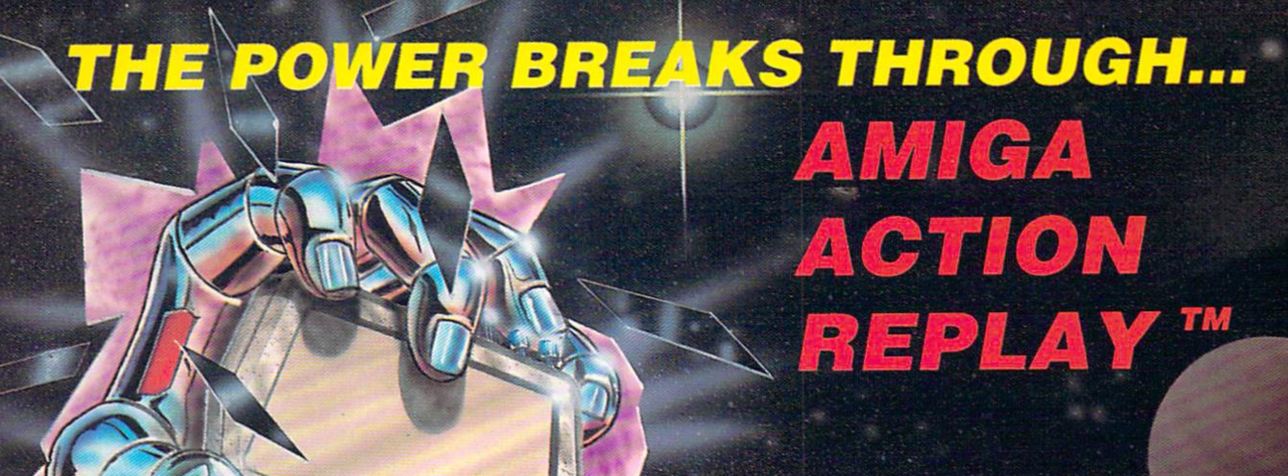


Here in "Cartoon" the author has colored the character with DPaint's Fill tool and composited it into the painted background as an animbrush. Using The Director for post-production enhancement, he then page-flipped the moon across the sky at a different rate.

One of my favorite tricks makes use of the partial-screen page-flipping techniques I outlined in an earlier column (see June '89, p. 50). By combining this style of Director "BLIT" animation frame by frame with an anim, you can disguise the periodicity of the anim loop. For example, a blitted moon can rise slowly in the sky over 20 or 30 cycles of a looping anim. Some of these added effects are easy to achieve with The Director, some are challenging, but putting these final touches on a production can provide polish and give a piece a truly professional look. Post-production techniques created with The Director were used in the last two winners of the prestigious BADGE (Bay Area Amiga Developers' Group) animation contest—and with a little effort you can add them to your work as well. ■

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope.

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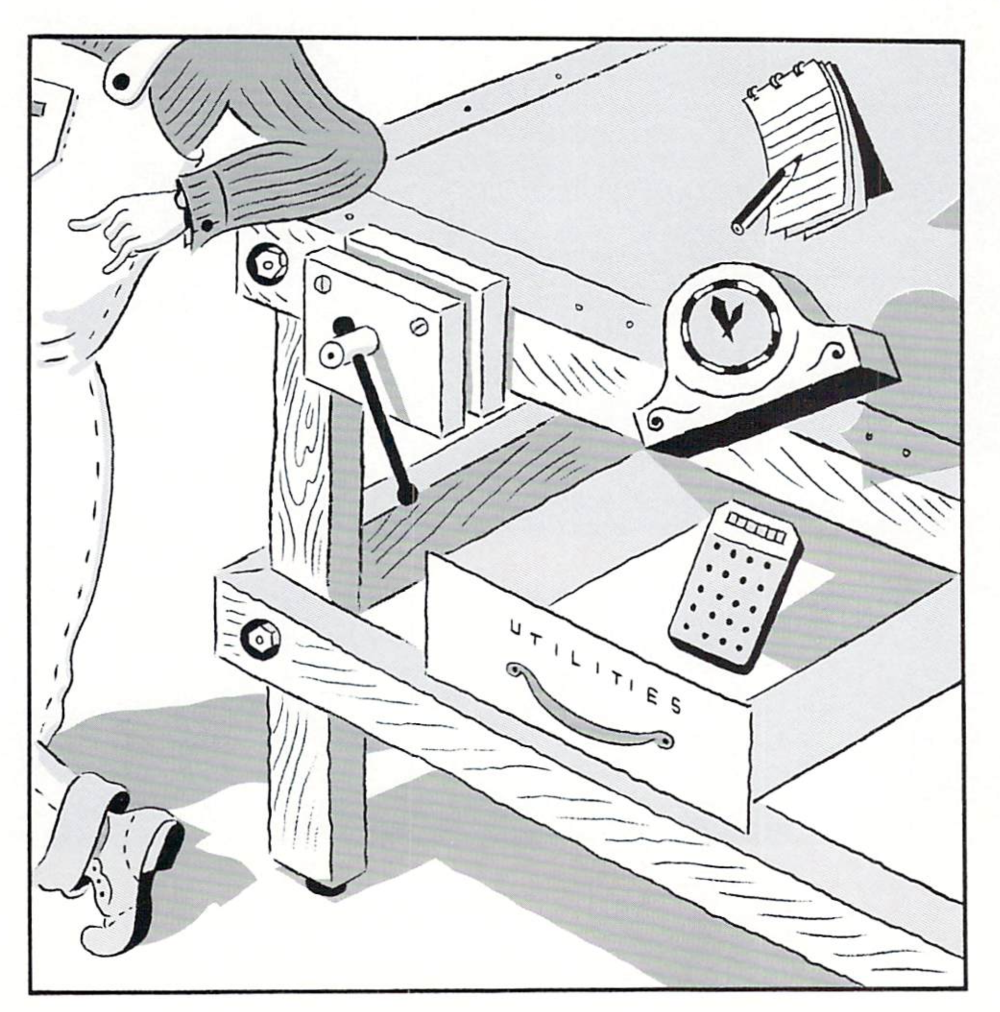
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Back to Basics Part 3

Adding some new wrinkles to using the Workbench, Team info.phile steps up the pace a bit in its mini-series for Amiga novices.

By Mark L. Van Name and Bill Catchings



NOW THAT YOU know a little about the four types of Workbench information objects—disks, drawers, tools and projects—let's extend the range of basic operations you can perform on them. After that, we will take a closer look at some specific tools that are standard equipment on your Workbench disk.

MOVING PICTURES

One of the simplest tasks you can perform with the Workbench is to move icons. Just click and hold down the left mouse button on the icon you want to move, and then drag it to its new location. This procedure moves any tool, project, or drawer from one disk partition to another as long as you stay within a single disk. If you drag a tool, project, or drawer icon from one disk to another, the original icon is not relocated. Instead, the Workbench copies that object onto the second disk and the original stays where it is. If you drag one disk's icon onto another, the Workbench replaces the second disk's contents with a copy of the first.

Be warned, also, that you cannot drag a disk icon into a drawer; if you try, the Workbench will ignore you and do noth- ►

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ing. If you want to copy everything on one disk into a drawer on another disk using the Workbench, you will have to copy the source disk's drawers, tools, and projects by using the above procedure.

To make copies of objects within the same disk, "select" that object's icon (click the left mouse button on it), go to the top of the screen, and bring up the Workbench menus by holding down the right mouse button. Next, choose Duplicate from the Workbench menu by releasing the mouse button. The resulting duplicate will have the name "copy of <object>", where <object> is the name of the tool, project, or drawer you selected. A duplicate of a drawer will contain copies of everything in the original drawer. If you wish to rename the duplicate so that you do not have to use the "copy of" name, employ the Rename command discussed in "Back to Basics Part I" (see Feb. '90, p. 74).

If you make enough of these copies, your disks will start to fill up. In fact, your disks will probably fill up no matter what you do because data always seems to expand to fill the available space. When you start running out of room, it's time to clean house by throwing out any unnecessary objects. (Of course, it's not a bad idea to keep a backup disk with copies of anything you delete, in case you later regret your decision.)

The Workbench provides two easy ways to delete. You can simply drag the item's icon to the Trashcan icon and release the left mouse button. Presto! the icon disappears. The object, however, is still recoverable because the Trashcan is just another Workbench drawer. You can open it in the usual way, remove any object icons you want, and move them to another location.

If you want to delete the object permanently, select the object's icon and choose Discard from the Workbench menu. A requester will appear with the message, "Warning: you cannot get back what you discard," and two options, "ok to discard" and "forget it!" Click on the former and your object—in its entirety—is gone forever.

The Trashcan method of deletion is safer because it saves you from over-zealous deletions, but it does not free any additional space on your disk. When you are certain you have no further use for objects in the Trashcan, you can get rid of them permanently by choosing Empty Trash from the Disk menu. This procedure gains space on the disk, but remember it is equivalent to using the Discard option from the Workbench. Also, keep in mind that while you can use the Trashcan for tools, projects, and drawers, it will not work with disks. The Trashcan is a drawer, and as we mentioned with the copying procedure described earlier, you cannot move an entire disk into a drawer.

Tools of the Trade

Once you have mastered these basic Workbench operations, you are ready to start working with some of the many Workbench tools and utilities. We do not have space in this column to cover them all, but we can at least take a look at a few. If you open the Utilities drawer—the main warehouse for these Workbench objects—you will discover some of the important ones. Three of its goodies, ►

Notepad, Calculator, and Clock, have been with the Amiga from the start (and like the Amiga, have all improved with age).

The biggest and most powerful tool of the three, the Notepad, is not really a complete word processor, but it's more than adequate for writing simple memos or letters. When you open it, a small white window labeled Notepad appears in the upper center of the screen. As you type, it wraps text automatically so you need to hit the Return key only when you want to end a paragraph. Notice that if you press the right mouse button, the Notepad's five menus—Project, Edit, Font, Style, and Format—will appear. When you are ready to save your work, choose Save As from the Project menu and a requester will appear. Fill in the name you want to use for your document and then click OK.

Although this is all you absolutely have to know about the Notepad, its other menus will greatly increase your options, and we urge you to explore them. Edit allows you to cut and paste text and to search for and replace strings. Font lets you choose different typefaces for your text, while Style enables you to make that text italicized, bold, or underlined. Format provides global formatting options, including ones that control background and text colors, word wrap, and overall document font. One of Notepad's best features is its ability to have multiple fonts in a single document; you can then print the document as a bitmap graphic in much the same way as you can with a commercial WYSIWYG word processor.

Basically just a computerized version of the simple hand-held calculator, the Calculator utility appears roughly in the same spot as the Notepad when you click on its icon. You can enter numbers by clicking on its display or by typing on the keyboard. While it offers only the basic arithmetic functions (+, –, *, /), it's handy to have around.

When you click on the Clock icon, a round analog clock appears in the upper left of the screen. If you want a digital display, you can choose from two options on the Type menu: Digital 1 gives you a two-line clock while Digital 2 provides a single-line clock, handy for stashing in the Workbench's menu bar. Other Clock menus allow you to set an alarm function, to turn the alarm on or off, and to display or not display seconds and the date. The Clock, like the Notepad, runs in a standard Workbench window; so if you do not like its position or size, you can change them just as you would change those of any other window. (The Calculator is a bit more limited; you can move it, but you cannot change its size.)

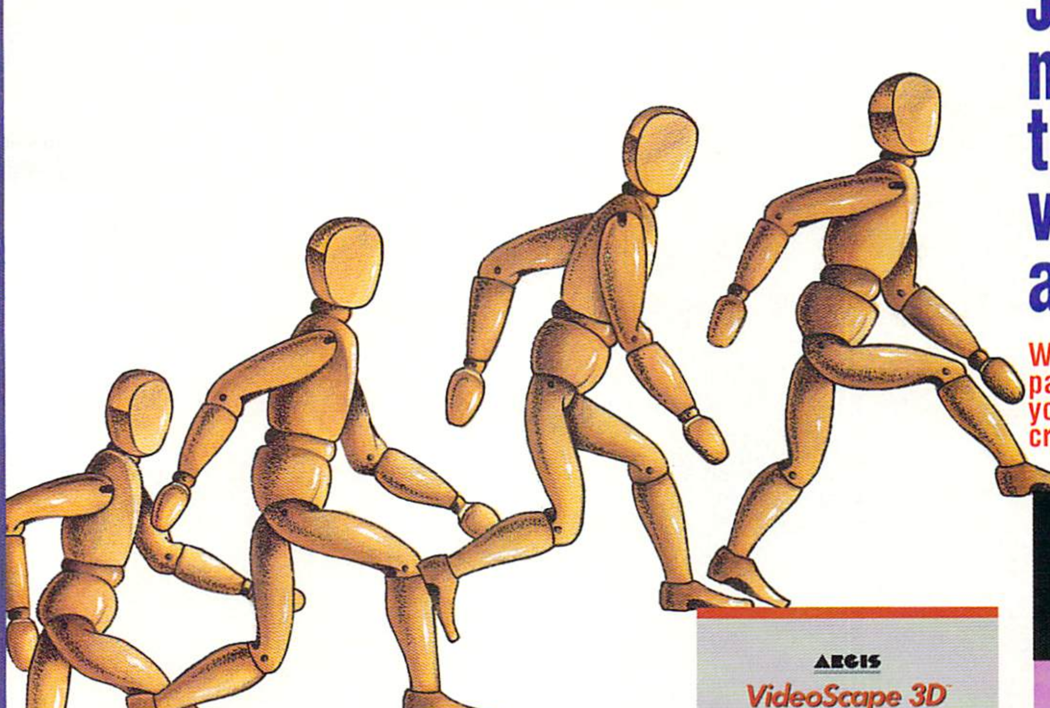
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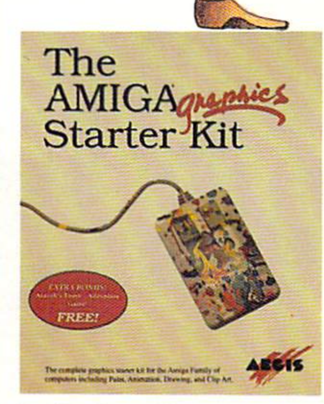
We've skipped quickly through these utilities so you'll have an idea what they can do. The best way to learn about them is to use them. Try a time-tested exploration technique: Start at the left menu and choose every option, one by one, and see what it does. (In the case of the Notepad, of course, do all this on a scratch note that you don't really need.) There is no better way to learn than by doing. Good luck! ■

Mark L. Van Name and Bill Catchings are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Dr., Durham, NC 27703.*

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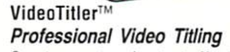


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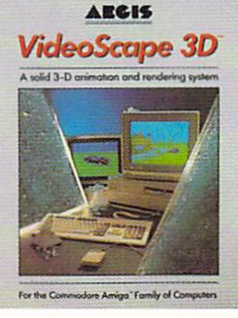
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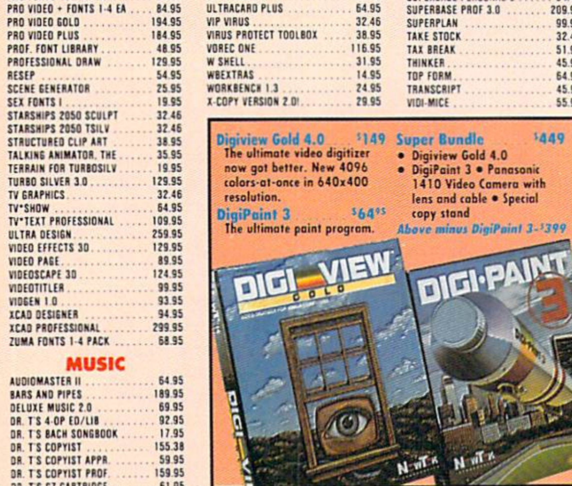
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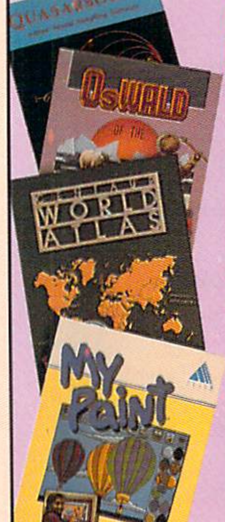


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Assembly Language From Amiga Basic

By Bryan Catley

DO YOUR AMIGA Basic programs need a boost? By incorporating assembly language routines with Amiga Basic you can speed up your applications. BASIC is an interpretive language and by nature slow. The programs that execute the fastest are written in assembly language and converted into machine language on a one-instruction for one-instruction basis by an assembler. The results can be spectactular. Thus, if you have some process-intensive code (such as a series of involved calculations), consider an assembler subroutine to perform the task.

With Amiga Basic, once the machine language has been loaded into memory it is invoked in the same manner as any natural subprogram or library routine:

```
CALL myMLroutine(param-1,...,param-n)
```

Note that you can pass parameters.

Of course, first you need an assembler subroutine to import. A good example is the one in Chapter 6 of your Amiga Basic manual. It is not too big or too small; plus it uses both character string and numeric parameters. The subroutine accepts a character string and converts all lowercase letters to uppercase.

You have two options for getting the machine language code into memory. The first method is the more traditional approach and is satisfactory for small routines that may be stored in DATA statements. The second method is better for larger routines, which are best loaded directly from disk.

Old-Fashioned Work

The traditional approach involves storing the machine language in DATA statements, using Amiga Basic's READ command to store the machine language into a character string byte-by-byte, and then executing the code just created. The code would look similar to the following:

```
mlCode$=" "
mlLength%=20
FOR n=1 TO mlLength%
  READ x$
  x$="&H"+x$
  mlCode$=mlCode$+CHR$(VAL(x$))
NEXT
DATA 48, E7, C0, 80, ...
mlRoutine&=SADD(mlCode$)
CALL mlRoutine&
```

It looks good, but will be successful only half the time. The reason is quite simple. When Amiga Basic allocates the memory for mlCode$ (or any string variable), it does so at the next available location, which may or may not be at an even address. If the memory allocation falls on an odd address, and you subsequently place machine code there and then try to execute it, you'll get a Guru #3 (addressing) error every time!

To avoid this, use the AllocMem library routine, which always allocates memory at an even address. Next, READ the machine language as shown above, but then POKE the code into the allocated memory. As in the example:

```
' Example of Poking a Machine Language
' Subroutine into Allocated Memory
'
LIBRARY "exec.library"
DECLARE FUNCTION AllocMem& LIBRARY
' get some memory, pick up machine
' language, and poke it into that area.
mlArea&=AllocMem&(56, 1)
FOR n%=0 TO 27
READ xNum$
POKEW mlArea&+n%*2, VAL("&H"+xNum$)
NEXT
' the machine language subroutine
DATA 48E7, C080, 202F, 0010, 206F, 0014
DATA 4281, 6000, 001C, 1230, 0000, 0C01
DATA 0061, 6D00, 0010, 0C01, 007A, 6E00
DATA 0008, 0230, 00DF, 0000, 51C8, FFE4
DATA 4CDF, 0103, 4E75, 0000
' request input from user
INPUT "Enter a mixed case string: ", s$
strLength&=LEN(s$)
strAddr&=SADD(s$)
' execute the machine language program
CALL mlArea&(strLength&, strAddr&)
' show user the result
PRINT "Converted value is: '";s$;"'"
' free allocated area and quit
CALL FreeMem (mlArea&, 56)
LIBRARY CLOSE
END
```

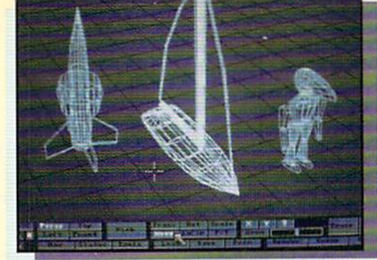
The machine language is straight out of the example in the manual, but the Amiga Basic code is anything but! Unlike the manual example, the above routine works correctly consistently. Notice the differences: The code is read and poked two bytes at a time to speed things up. It invokes the code using the CALL statement and the code's address. It passes the length parameter as a long word value and the string parameter as a memory address.

This approach is not as effective for larger routines. After all, the machine language has to be stored twice in the program, once as DATA statements and once as executable code, plus reading and poking takes some time. A more serious problem is that all addressing must be done relative to the Program Counter (PC relative addressing), because the sys- ►

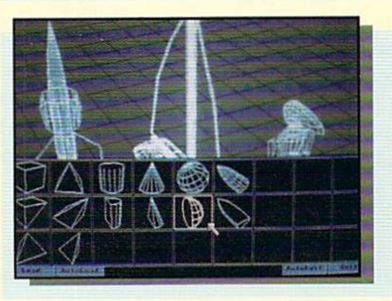
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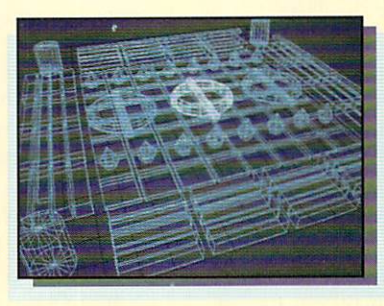




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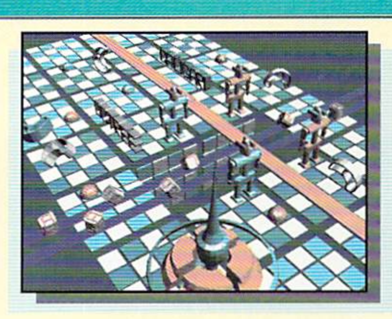
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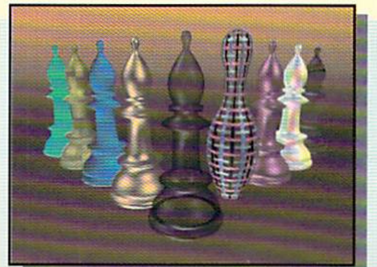
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tem has no knowledge of the routine or its starting address. The system is therefore unable to automatically adjust addresses for the actual load point, which it usually does as part of the loading process. While not a big problem with small routines, this is a major headache with large programs. The solution is to use a system routine to load the subroutine, handle all the memory allocation and alignment requirements, as well as remove the need for PC relative addressing.

SYSTEM SELF-SERVICE

The sole purpose of the dos.library function LoadSeg is to load machine language from disk and prepare it for execution. The only catch is that the code must be in load module format; it must have been processed by a linker, meaning the source code must have been assembled. To use the LoadSeg method, therefore, you need access to an assembler and linker. LoadSeg's other oddity is that it does not return the address of the loaded program. Instead, it returns the number of long words (four bytes each) from the beginning of memory to the start of the long word immediately preceding the first byte of executable code. (These four bytes contain the number of long words of code). This means the program must perform a small calculation to determine the starting address of the actual code. Use the following code fragment as a guide:

```
' set up name with a trailing zero
pgmName$="myML"+CHR$(0)
' load the named module
pgmPtr&=LoadSeg&(SADD(pgmName$))
' calculate starting address of code
' -first multiply number of words by 4
Code&=pgmPtr& * 4
' -now add another 4
Code&=Code&+4
CALL Code&
```

When you no longer require the subroutine, remove it from memory as shown:

```
CALL UnloadSeg(pgmPtr&)
```

With your assembler and linker, carefully enter the assembly subroutine as shown in your Amiga Basic manual, assemble it, and link it. You may use any name you wish; I named my sample Ucase.exe. Now, enter the code below, ensure your machine language is in the current directory (although you may use a full path name with LoadSeg if you wish), and run it. It functions exactly as the earlier example with the single exception of using a load module from disk rather than DATA statements.

```
' declare function(s) and open the
' dos library
DECLARE FUNCTION LoadSeg& LIBRARY
LIBRARY "dos.library"
' load subroutine, and get pointer
loadModule$="Ucase.exe"+CHR$(0)
pgmPtr&=LoadSeg&(SADD(loadModule$))
IF pgmPtr&=0 THEN
PRINT "LoadSeg Failed"
GOTO Quit
END IF
' calculate start of code address
Ucase&=pgmPtr& * 4+4
' get user's input, set up parameters
INPUT "Enter a mixed case string: ", s$
strLength&=LEN(s$)
strAddr&=SADD(s$)
' execute the machine language routine
CALL Ucase&(strLength&, strAddr&)
' show user the result
PRINT "Converted value is: '";s$;"' "
' remove called routine,
' close up library, and terminate
UnloadSeg pgmPtr&
Quit:
LIBRARY CLOSE
END
```

Using these techniques will allow you to include assembler routines in your Amiga Basic programs. I wouldn't recommend including them just for the sake of having them, but for specific functions they can be great time savers. Don't be shy if the need arises. ■

Bryan D. Catley is a professional software engineer and is presently integrating unlike software on IBMs and Suns. Write to him c/o AmigaWorld *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

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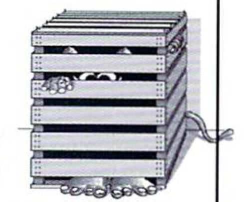
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It Came From The Desert

By Dodson Yaple

HEADLESS COWS, sinister cult figures, giant ants—wow, guests on the next *Geraldo*? Nah, just some of the scenery in It Came From The Desert, Cinemaware's homage to the bug-fear flicks of the fifties.

You're a visiting geologist in Lizard Breath, where a recent meteor impact was the first excitement in years. Since then, peculiar incidents have disturbed the town's normally tranquil atmosphere. You do a little investigating, and guess what? You find you've become a walking Human McNugget.

The townsfolk are skeptical of your warnings; these desert types take a lot of convincing when it comes to ants the size of locomotives. You won't be able to get your hands on any heavy-duty firepower until you can persuade the dim-witted mayor to declare an emergency, so your first task is to accumulate evidence. Problems arise: Your house catches fire, you meet a mysterious woman on the run, and you have trouble getting enough sleep. Even worse, giant ants keep trying to consume you. These complications are rarely fatal, but they do lead to a lot of costly hospital time under the supervision of the air-headed Nurse Judy. Give her the slip, because you only have a week or two to locate the creatures' nest, venture into its awful depths, and then...



You'll need more than Raid to kill these bugs.

Playing the game is easy and intuitive, especially if you're familiar with Cinemaware's map-and-arcade approach. Amid the mortal combat with knives, cars, pistols, grenades, dynamite, tanks, jet planes, and bug spray there is plenty of character interaction. Weak dialogue and misspellings limit its effect, but these are the only flaws in an otherwise highly-polished product. The graphics, music and digitized speech are outstanding, the disks are not copy-protected, and you can play from RAM or a hard drive. It Came From The Desert is a knockout. *($49.95, Cinemaware, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. One megabyte and joystick required.)*

Never Mind

By David T. McClellan

FULL OF PSYGNOSIS' trademark artwork and crisp animation, Never Mind requires you to reassemble a picture whose pieces are scattered over a perspective landscape made of floors and walls at right angles to each other.

With a joystick, you walk

Crib Notes

By Peter Olafson

• The initial puzzle in The Jetsons (MicroIllusions, $39.95) is getting George into his car. Go car. Uh-oh, the canopy is closed. Open canopy. Uh-oh, the canopy is locked. Where are those keys, anyway? Finding them relies on good eyesight more than anything else—so good, in fact, that you may not notice them the first few times through the apartment. Don't expect much help. Everybody seems to have cleared out (Rastro ris areep). But there is somebody—or something—around to give you a reluctant hint. Use reverse psychology.

• After the initial expansion phase (the first four or five turns) in Kingdoms of England (Incognito, $44.95), try to sculpt your territory so it has the shortest defensible frontier, and put all your armies on the cutting edge. (You should garrison your home castle, however, at least until you've taken an opponent's.) Don't leave a castle army in interior provinces against the chance of an attack; you can't afford to play a defensive game. Leave vacant any province that isn't under immediate threat of attack.

• You can't get to the heart of Joan of Arc: Siege and the Sword (Broderbund, $49.95) unless you can master two arcade games (and save your progress). The first has you charging across the bridge and chopping up enemy troops. You can get ahead more quickly if you seize opportunity and occasionally change your swordfighting tactics. The other game places you at the foot of three ladders as troops on the parapet hurl rocks and spill boiling oil. All you can do against the oil is jump to the next ladder. The trick ►

Rings of Medusa

GAME OF THE YEAR 1990?

You'll love this game—We guarantee it!



Discover on your own if this claim is true as you, the young Crown Prince of Morenor, challenge the evil goddess Medusa. Conduct trade, gamble in the Casino of the Trolls, find treasures, equip an armada of ships and engage in sea battle. Hire and fire warriors for your land army and go into battle. Explore 33 cities, 13 castles and 3 islands. Find the five magic rings of the kingdom and put them together in the Temple of the Athenians. It is your only hope to call Medusa into battle.

- 3500 Kbyte of data, over 500 Kbyte of digitized sound
- Beautiful graphics, excellent strategy and game action
- Weeks and months of game experience

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Can't find RINGS OF MEDUSA? For orders only, call: 1-800-783-8023. Retail price: $49.95. Available for: Commodore Amiga, IBM PC, Tandy, 100% Compatibles and Atari ST.

your character (a desperately unhappy medieval-looking figure) around picking up and moving tiles to complete the painting before the time limit runs out. To move between the floors and walls you must find and jump in the proper warp tube. Your reward for a successful round is a crack at the next and nastier puzzle. Fail and you start over at the beginning. There are 250 levels of this madness, each with one or more pictures (made up of square tiles), which you preview whole only briefly.

At higher levels, complications set in. Some pictures are animated and obstacles appear. Chess pieces block your way and move tiles (I think they make legal chess moves, but I was too mad to be sure). Bridges to islands disappear, and quicksand tiles melt under you.

A few touches ease the frustration. Once you reach certain plateaus, you receive passwords that let you skip over preceding levels. You don't score as high when you do this, but the option makes life easier, as does the pause button. While the help button shows you the completed picture, it then deducts most of your remaining time on that level.

Overall, I give Never Mind high marks. The joystick controls are touchy, but the animation, music, and puzzles are great. If you like thinking games, get this one. You won't be sorry. *($34.95, Psyclapse/Psygnosis, distributed by Computer Software Services, 2150 Executive Dr., Addison, IL 60101, 800/669-4912. Joystick required.)*

POWERDROME

By Timothy Trimble

LIKE CONVENTIONAL racing games, Powerdrome offers multiple race tracks, pit stops, qualifying heats, and much more. The big difference is that you fly a quad-boosted Typhoon racer, complete with afterburners.

You can select one of seven tracks (each on a different planet) for practicing or racing against the computer or a friend whose machine is connected to yours via a null modem cable. For a bigger challenge, choose the Championship race, in which you start at Track 1 and continue through Track 7. The graphics are fast, and the sound is great. Being able to nudge other ships, hear them as they approach you, and see them in your rearview monitor, adds to the excitement.

The Typhoon racer's flight characteristics are very similar to those of a fighter plane with a "fly-by-wire" control system. Moving the yoke (mouse or joystick) to the right rolls the racer clockwise with the nose still facing straight down the track. To make a right turn, roll to the right, then pull back on the yoke, which swings the nose of your racer into the turn.



Fly through the races.

Practice mode pits you and your ship against the walls, twists, and tunnels of the track. Using the racer's force field settings will help to keep you away from the walls, but higher settings reduce your speed. Pit stops give you a chance to repair the wings and engines, replace filters (needed for flying in different atmospheres), adjust the roll and pitch characteristics, and select the fuel grade (nitro grade is best, but burns fastest). All that's missing is the smell of the fuel and the hot engines. *($39.95, Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. No special requirements.)*

is to know when to advance. There is a small window of opportunity during which the soldier guarding your ladder disappears. Use it.

• You're going to go nowhere fast in Leisure Suit Larry II: Looking for Love in Several Wrong Places (Sierra On-Line, $39.95) unless you look in the garage. I'll wager you know what to do with what you find.

• The first semi-tricky room in Dragon's Lair (ReadySoft, $59.95) is the one with the tentacles. You are more or less led through it—just follow the flashing objects—but your guide is running and you'll need to be quick on the stick. Get your sword out pronto when the tentacle appears, and don't be impatient with the rear door at the end. One timely push with joystick will get you there. More will order lunch for the tentacles.

• If you have a new character in Alternate Reality: The City (DataSoft, $39.95), don't leave the central square. The monsters usually lie low here. The businesses are pricey, but they're close together. (If one isn't offering work, another may be.) Much of consuming interest lies just out of sight, including one of the attribute-enhancing guilds. If you can't afford the inn, there's a cheaper one on the left up the northern main street.

• If you're not doing so hot as a boxer in the graphic adventure version of Indiana Jones and the Last Crusade (Lucasfilms, $59.95), well, talk is cheap. Virtually every guard in the castle can be outwitted, though it'll take some trial-and-error. You'll have to fight the towering Biff the Nazi, but he'll be a regular Bill the Cat if you have the right combination of items. You'll have to fight at least the first couple of guards after you don the German uniform.

The ticket-taker on the zeppelin won't take any guff from you at all—he wants tickets, not excuses—so be prepared to fight like an Olympic-medal-winning boxer (as the ticket-taker is) if you don't have them.

• You can not only fend off the enemy ►

F-16 Combat Pilot

By Kevin C. Rohrer

ANOTHER FLIGHT simulator has rolled out of the Electronic Arts hangar, one with role-playing elements to give it depth.

You begin your F-16 fighter pilot career in the Squadron Crewroom. There you can access your log, pick missions, and perform administrative functions. Once you pick your mission, plan your route using the Electronic Strategic Display, select your aircraft's weapons loadout and fuel, and take off. All the offensive and defensive weapons of a real F-16 are at your command: cannon, bombs, air-to-air and air-to-ground missiles, flares, chaff, and recon pods.

The simulator shines in its multiple levels of play. The first level consists of training, where you can fly any of seven missions without having to worry about damaging your career, no matter how many planes you crack up. You'll need the practice; the aircraft is overly sensitive to the joystick. Once you've got a feel of your plane, begin your career by picking such operational missions as Tankbuster (close air support), Scramble (air-to-air interception), or three others. With these under your belt, you are promoted from being a mere fighter jockey to commanding your own fighter squadron.

At this level, the simulator takes on role-playing elements. You'll be faced with Operation Deepstrike, which consists of trying to halt a constantly attacking enemy force by assigning your pilots a variety of missions while continuing to fly yourself. Continued combat will take its toll of aircraft, weapons, and spare parts; plan on having to do too much with too little. Should you succeed, you'll be asked to move up to a higher level squadron to face a tougher, more skilled enemy.

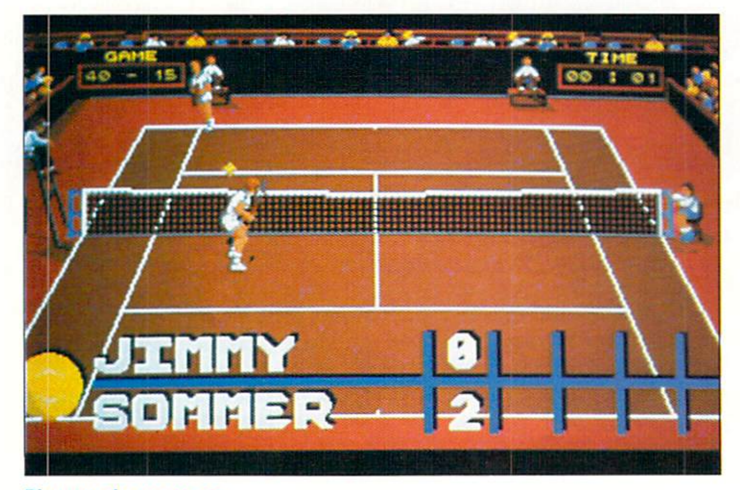
F-16's scenery and sounds might not provide the visual and aural delights of other flight simulators, but the detailed aircraft displays, varied missions, and increasingly difficult responsibilities more than hook you into the action. *($49.95, Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. No special requirements.)*

Pro Tennis Tour

By Rick Teverbaugh

YOU HAVE TO be careful how you label things. Pro Tennis Tour is billed as: "The Ultimate Tennis Simulation." Tsk, tsk. To make it so, the developers need to correct several flaws.

The manual's organization, completeness, and clarity are atrocious and the game is just too darn difficult. It opens at its easiest level. I had four matches of 6-0 losses before I won a game. The manual gives very little help on how to execute the shots needed to win. On the easy level, the ball always goes over the net on serves, usually when you are at the baseline, and seldom when you are at the net. As a hint on where to stand to return a shot, a mark appears on the court. You barely have enough time, however, to get to it. On more difficult levels the mark disappears, the ball ►



Play on clay or grass.

troops around Damaron in Sinbad and the Throne of the Falcon (Cinemaware, $29.95), you can do away with them entirely. Have your, ah, encounter with the witch Libitina early in the game (play up to her saucy talk), withdraw your forces around the city, and let the Black Prince take Damaron. You will automatically rush home, but this time your fight is to the death. Libbie has made you nearly invincible, so the Black Prince is dog food.

• The Shadow of the Beast (Psygnosis, $49.95) is a cold place. To warm it up a bit, go left at the start. The well to the right is useless—at least at this point—and what lies beyond (giant bloody horns coming up out of the ground) is more than you want to deal with in the wee hours. Don't go too far left or right when initially underground.

COMPANIES MENTIONED:

Broderbund Software Inc., 17 Paul Dr., San Rafael, CA 94903, 800/527-6263, 415/492-3200.

Cinemaware, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171.

DataSoft, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171.

Incognito Software, 34158 Warren, Suite 149, Westland, MI 48185, 313/462-2148.

Lucasfilm, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171.

MicroIllusions, 17408 Chatsworth St., Granada Hills, CA 91344, 800/255-5217, 818/360-3715.

Psygnosis Ltd., distributed by Computer Software Services, 2150 Executive Dr., Addison, IL 60101, 800/669-4912.

ReadySoft, PO Box 1222, Lewiston, NY 14092, 416/731-4175.

Sierra On-Line Inc., PO Box 485, Coarsegold, CA 93614, 209/683-4468. □

DESK TOP STUFFING.



Konami is cooking now, with a hot computer game that gives you complete control of world championship caliber basketball, featuring Chicago, New York, Boston and LA.

From the opening tip, it's 5 on 5, full court, board crashing action, highlighted by blocks, steals, picks, foul shots, 3 point bombs and 3 kinds of slams — the Gorilla, the Rim Rockin' Reverse and the In-Your-Face Jam!



Two can play at this game, or you can challenge the computer. Either way, it'll take all the runnin' and gunnin' you can muster if you hope to savor the taste of victory.

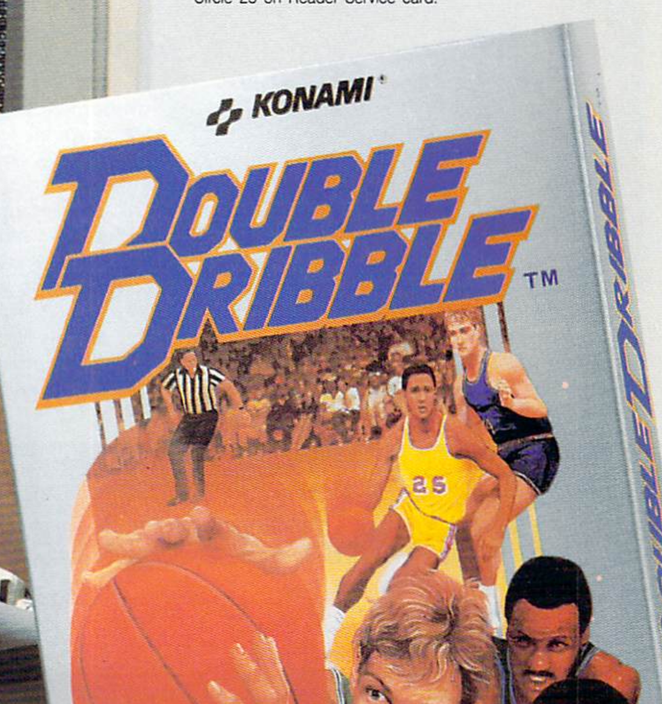


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Double Dribble is available for IBM. Also Commodore and Amiga in early 1990.

Circle 25 on Reader Service card.



becomes increasingly harder to control, and serving becomes a three-step process. You definitely need to practice against the ball machine before tackling the four grand slam events.

Against the computer foe, you are always on the side of the net in the foreground of the end-view screen. To make matters worse, the good computer opponents often hit the ball at such sharp angles that you need to go beyond the side out-of-bounds line. The program, however, won't let you run past the sideline to return a shot.

Because of the program's size, owners of only 512K machines must disconnect all peripherals before attempting to load and play the game. The command card tells Amiga 1000 owners to call customer service if they have problems loading the game.

While its graphics are gorgeous and the sound very lifelike, Pro Tennis Tour is below the usual quality of the Electronic Arts sports line. Sit out this match. *($39.95, UBI Soft, distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415/571-7171. Joystick required.)*

VORTEX

By Bruce Jordan

MAN HAS BEEN mucking about with the forces of nature and ripped a hole in the fabric of space-time itself. In Vortex, you must close the hole before matter meets antimatter and both universes go *poof!* Along the way, you'll need to battle a continual onslaught of enemy critters.

In the center of the circular game screen depicting deep space is an ominous, thrumming vortex of doomed stars and super-heated matter. The vortex spews out antimatter pods, which adhere to the containment wall, and several free-floating nasties. You must maneuver your ship (via the mouse) about the screen, attempting to return the antimatter to the vortex (bank shots off the containment wall work well), while fending off attacks. You can even launch decoy ships to lure the enemy to its destruction.

Vortex is an arcade game in the strictest sense: You cannot save games, and one slip sends you back to square one. You can choose from three starting levels, but can reach higher levels only by successfully completing previous ones. The manual is short and to the point, plus gives a few hints. The introductory screens provide additional scoring information.

While visually beautiful, intense, deadly, and addictive, the game is rather like a baroque fugue: It increases in complexity without much theme development. Vortex is one-dimensional without imagination and depth worthy of its presentation. Seasoned arcade players will find it lacking. *($44.95, Visionary Designs, distributed by Media Technology Ltd., 15235 Shady Grove Rd., Suite 100, Rockville, MD 20850, 301/926-8300. No special requirements.)* ■

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from p. 14

a traditional synthesizer, which produces an immediate change in sound based on your edition of a patch's parameters, Synthia Professional calculates a waveform from the vast array of parameters available. You can load the result into one of the supported samplers, just as you would with any sample.

The program also serves as an editor to cut, paste, and loop existing samples or its own synthesized waveforms. It has a plethora of digital signal-processing (DSP) functions, and is compatible with most common file formats.

The package includes the program disk (which is copy protected with the key-disk format), a disk packed with examples of all program functions (which are referenced in the manual), and a utilities disk containing a SMUS player and several musical scores produced using Synthia sounds. You'll need at least a meg of memory to run the program, and as always when samples are involved, the more RAM the better.



Less is more in subtractive synthesis.

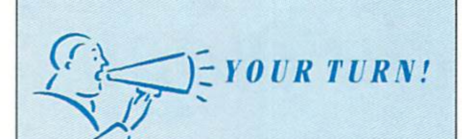
THE FAT LADY SINGS

The sizable Synthia Professional offers many, many ways to create sound. The place to start is the Synths menu. New Instrument Parameters, the first menu item, dictates the parameters of the sound or "instrument" to be generated. These include sample rate and length, root key, number of samples (four or five comprise the average multi-sampled instrument), the interval of each sample, auto-looping, and Presets, which set the configuration for a particular file format.

Selecting a synth opens a window of parameters. All synth modules are set up similarly, each containing parameters pertinent to its own form of synthesis. Because you cannot size these windows, screen clutter can be a problem (I solved this by using D-Mouse, a public-domain utility that summons any window with a mouse click).

Every window has a Make gadget, which tells the program to calculate a waveform from the settings in the window. Each also has an Undo gadget for cancelling the last action, and a Keyboard gadget that opens a keyboard window and allows you to play sound with the mouse while showing the key map range of each sample. A sample selector tells you which of the several samples that may be in the current instrument will be affected by changes. Another selector determines whether the sample(s) created will be based on the data in the New Parameters window or on another ►

sample. In most windows you will also find a Waveform gadget; it opens yet another window in which you can design carrier waveforms. Gadgets for modulators and envelopes open similar windows. A Frequency slider governs the frequency of the generated instrument, but no readout is available to tell you what that frequency is. Finally, every window has a Mix slider to combine the current sample with whatever that window generated. This can be a straight mix or a multiplication, which results in ring modulation.



Synthia Pro allows me to implement more than one form of synthesis at a time and it sounds realistic rather than electronic. The program works well in a multitasking environment and comes with an excellent manual.

—Allen Slacks
West Hollywood, CA

SHAPING UP

The Waveform/Envelope Editor provides an incredible number of ways to design a wave or envelope. It occupies the entire screen, and you cannot open other windows over it. A title and a message tell whether you are editing a waveform or an envelope. In the center is a box that displays the current waveform. When you are editing a wave, the horizontal scale in the box reads "1 cycle"; if you are working with an envelope, that scale reads "length of sound." (A real-time scale, helpful in designing envelopes for long sound effects, is not included.) At the bottom and right are sliders that position, expand, contract, and distort the waveform horizontally and vertically. To the far right is another box containing buttons to draw sine, square, and triangle waves, to scale to full amplitude, to draw ramp up or ramp down (for envelopes), to reverse, mirror, square, or take the square root of the current waveform, to smooth out rough spots, produce random shapes, and to clear the area.

At the far left is a panel of sliders for mixing harmonics one through 16. If you choose Wave, the panel mixes the selected harmonics of the current wave at the levels set by the sliders. If Sine is selected, the wave is replaced by a mix of sine wave harmonics (a kind of non-dynamic additive synthesis). Poly creates a mix of Chebyshev polynomials with slider one representing the first order polynomial, two representing the second, and so on. The Linear and Spline EG options draw straight and curved lines. A mix slider causes any function that would otherwise have modified the waveform to act on it as a modulator. Finally, you can have up to eight clips on line at a time and copy settings between Waveform/Envelope Editors.

IN PRODUCTION

The Subtractive Synthesis module bears little resemblence to its analog counterpart, and its harmonic possibilities far outnumber those available in an analog synthesizer. Two of the most critical components of subtractive synthesis—envelope-controlled filter and amplifier— ►

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appeared at first to be missing, but a closer look revealed that they are implemented as effects and as such are not limited to the Subtractive Synthesis module.

Additive Synthesis is provided in a fairly standard format—with 32 envelope-controlled harmonics—but does not limit you to mixing only sine waves.

Pseudo-Additive Synthesis is similar to Additive except that instead of mixing 32 time-variant harmonics to produce a dynamic waveform, you can combine up to 32 single waveforms, fading from one to another, to create sound. Both of these modules are very powerful, but working with them can be cumbersome. Because you can have only one Waveform/Envelope Editor open at a time, it becomes more difficult to imagine your final sound the more harmonics or waveforms you add. I would like to at least be able to see all the envelopes at once.

The FM/PM Synthesis module is very different from the Yamaha DX7-style synthesis most people think of when they hear the term FM. This module has a single carrier wave (which can be any one you create in the Waveform Editor) and a single envelope-controlled modulator (which also can be any wave you design). In PM synthesis, the frequency of modulating waveform is below the audio range; in FM, because the frequency of the modulator is within audio range, you get a wider harmonic spectrum.

Plucked String Synthesis simulates the timbral change that occurs over time when a string is plucked. Algorithms approximate the sounds of both steel and nylon strings. A Stretch slider determines the rigidity of the material being plucked or struck, and at its most rigid setting, produces a clink sound resembling bell or percussive instruments.

Interpolation Synthesis literally interpolates values to change gradually from one waveform to another. Like the Pseudo-Additive module, it lets you work with up to 32 envelope-controlled waveforms.

The Drum Synthesis and Noise Drum Synthesis modules create synthesized drums; the former produces a tom-tom-like sound while the latter delivers a snare-like effect. Both modules have sliders to determine pitch, decay, emphasis (degree of attack), bass boost, and bandwidth.



Synthia Pro is the only product I know of that can generate sound in 16 bits and download into professional samplers. To really work with it you must understand how sound is synthesized, generated, and applied to a sampling. Experienced users, however, will find the set sound-generating parameters to be slow.

—*Robert Pierce*
Westland, MI

Play Some Loop

You can edit and loop your synthesized waveform in the Editing Looping window, which shows the full sample at the top. Here you can define loop points and mark ranges for cutting, pasting, and crossfades (there are four variations of crossfade looping). In another smaller display, you can draw the sample. Precise looping is handled in the Fine Looping Adjust window. It aligns the loop start with the loop end at a point of zero crossing. Although the scrolling in this module works, it is not smooth.

In addition to the synth modules, Synthia has an impressive list of DSP functions under its Effects menu. These include Amplitude Modulation, a Pitch Shifter, Ring Modulation, Angle Modulation (which allows a waveform to frequency modulate itself), and Flange/PhaseShift. There is an envelope-controlled Filter/Filtered Noise generator with two settings of low, high and band pass filters, and one notch filter. The different low and high pass filter settings appear to represent different slopes, though there is no definition of what the slope is. The band-pass- and notch-filter ranges are not defined either—an odd omission. There is a very nice 32-band Graphic equalizer with a 12 Hz to 16 KHz range, and a distortion function simulates the sound of clipping, doubling, saturation, and two types of fuzz. The Echo/Reverb module offers eight al- ►

gorithms for echo and 16 for reverb. Chorus lets you determine how many new voices will emerge from the original. WaveShaper is an esoteric effect that distorts a waveform, apparently according to the values in a wavetable.

One thing I have noticed about some of the effects applies to software-generated effects in general, especially to reverb: They work much better on sounds that are not looped—drum and percussive sounds, for instance. To get around this you could apply the effect before looping, but reverb is the kind of effect I like to use to cover flaws like audible loops.

Applied Audio

What do you do with these sounds once you have created them? Well, you can save a sound's parameters as a window environment (the waveform is then recalculated when you load the parameters file back in). Or, you can save a sound as a sample in one of many formats. AudioIFF, the preferred format for Synthia, is a Macintosh format that the Mac can read if you select the Mac binary option when saving. Other supported formats are 8SVX, Sonix, SoundScape, and Raw. Most amazing is the ability to read and write in SoundDesigner format, another Mac format that has become a standard for sound samples. I created some drum sounds with Synthia, saved them as SoundDesigner files, downloaded them into my Mac, and from there transferred them to my SP-12 sampling drum machine. This is the kind of compatibility I would like to see in every music program.

I ran Synthia Pro extensively with an Ensoniq EPS sampler without a hitch. The interface is very smooth and easy to use. The developer claims that Synthia Pro also supports the Roland S550/330, the Korg DSS1, and the Akai S900.

For faster data transfer, I would like to see direct SCSI communication with samplers that support it (EPS, Emulator III). Another item on my wish list is a version for use with accelerated Amigas. Despite a few minor complaints, though, I like Synthia Professional. It is not for beginners, but those experienced with sound are sure to enjoy it.

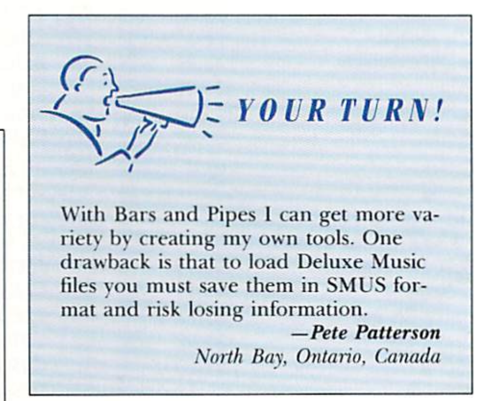
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Bars and Pipes

Hum a few bars and plumb a few pipes.

By Michael Hanish

BECAUSE NO TWO composers approach music making in the same way, music software must be flexible enough to meet a variety of needs. The one-size-fits-all Bars and Pipes does, offering



With Bars and Pipes I can get more variety by creating my own tools. One drawback is that to load Deluxe Music files you must save them in SMUS format and risk losing information.
—*Pete Patterson*
North Bay, Ontario, Canada

everything necessary to make and edit music using MIDI instruments. (While Bars and Pipes does not support the Amiga's internal sounds, this capacity is planned for an upgrade due to be ready by the time you read this.)

Bars and Pipes has all the standard recording and playback features we have come to expect, and then some. Included are the ability to record an unlimited number of tracks, one at a time or several simultaneously; selection of MIDI channels for input and output; mute, solo, or normal playback of all tracks; step-time or real-time recording; loading and saving standard MIDI files; SMPTE and MIDI time-code support; full editing facilities for tempo, dynamics, and song arrangement. Virtually all actions are done in the graphics-based en- ►

vironment. While this approach may alienate die-hard list users, the program's design is so exemplary that both experienced and novice MIDI voyagers will find it easy and intuitive to use.

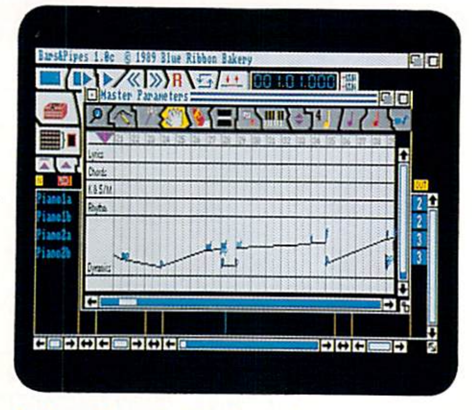
The program comes on one non-copy-protected disk, runs from Workbench, and installs easily on a hard disk. It opens onto the main sequencer screen—colorful and full of information yet uncluttered. Across the top of the screen are tape-recorder-style controls for moving through the music, and a timer showing in measures, beats, and clocks, either your place in the song or the position of the edit flags. The clock, which resolves to 196 parts per quarter note, can be displayed in SMPTE time (hours, minutes, seconds, and frames) as well. Below the transport controls are icons for the tool box and current tool, group selections, track display, solo/mute/thru, and the tempo-display box. The bottom half of the screen is filled with track displays, tools, and channel assignments.

IT'S ALL IN THE PIPES

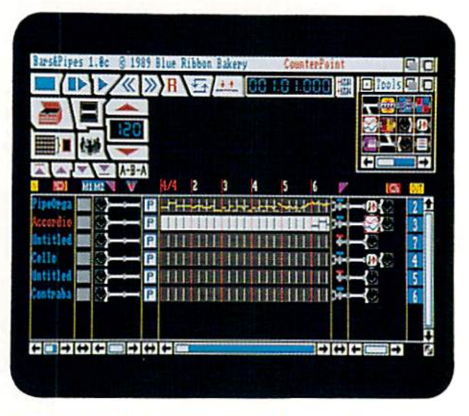
Although the world of MIDI can easily become a jungle of parameters and possibilities, it ultimately comes down to a conduit between synthesizer and sequencer, with musical information flowing through sixteen channels in between. Bars and Pipes is based on a plumbing metaphor, wherein each track is a pipeline carrying MIDI data. Like a plumber, you can redirect or split the flow and turn it on or off. With the graphic interface, what you see is what you get.

In the center of each pipeline is a small scrolling display of that track's note content. A double click on this display brings up the sequence-editing window, where notes are shown in detail on both a musical staff and a piano keyboard. With menus, you can resize and alter each track, including or excluding such items as velocity, program and control changes, dynamics, aftertouch, key and scale, rhythm, time signature, and lyrics. Multiple windows can be open at the same time.

Flanking each note-content display are the pipes themselves, into which you place tools to process the data. Starting and ending with the MIDI tool connects the input and output of the sequencer to your MIDI instruments and determines which parameters will be recorded and passed along. When placed on the left (input) side of the pipeline, tools process the data as it comes into the sequencer and the result is recorded. A tool placed on the right (output) side does not alter the original track data; its effect is heard only on playback. There are a number of tools included with the program, optim-



Tools on the output in the main sequencer.



Going global: dynamic markings and curves.

ized for a wide range of processing activities including echo and delay, feedback, counterpoint and harmony generation, transposition, filtering, dynamics, articulation, and quantization. Once you place a tool in the pipeline, you can edit its parameters and qualities.

Tools can be combined into macros in the Create-a-Tool window, a powerful feature that adds greatly to the program's flexibility. This allows you, for example, to take the track output and filter from a range of notes, feed them through the Counterpoint Generator, and send the output through the Transpose, Velocity, and Delay tools to a new track, all in one step. The window not ►

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MODEM OWNERS You can order from our Amiga Shop via CompuServe, GEnie and electronic malls.

only allows you to design the components and sequence of a macro process, but to design an icon for it as well.

Around the World in One Window

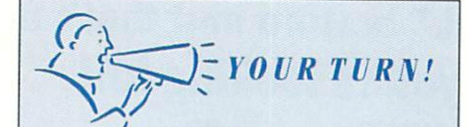
Global editing is done in the Master Parameters window, which, like the other windows, can be customized for appearance and content. Track and song parameters are interchangeable; tools (which you must use in conjunction with parameters) refer first to the track parameters for processing, then to the master parameters. All musical elements except section arrangements are available for editing here. Editing tools include a pencil (for making edit marks), an eraser, a magic wand (for changing existing parameters), a hand (to grab and drag or change parameters and notes), and a bounding box and edit flags (for marking off sections of the sequence to be affected). Finally, the Toolizer (which is also found in the sequence editor), allows a section or entire track to be processed in place by a particular tool.

If you do sequence editing or rearrangement, you'll appreciate Bars and Pipes' support of the Amiga's clipboard device, which allows you to cut, copy, and paste between tracks. The clipboard holds multiple clips (each of which can be renamed), and you can save the clipboard's contents.

Bars and Pipes' learning curve is relatively shallow. Getting used to editing in a graphics-based environment and learning to use the tools effectively and predictably takes little time. The manual is clear and direct, so even neophytes can become productive quickly. Also, the program's open design is conducive to experimentation.

There are no show-stopping problems with Bars and Pipes, but the designers seem committed to getting the program just right. Upgrades with new tools and bug fixes appear regularly (among promised additions are an arpeggiator, an automated mix-down tool, algorithmic composition tools, and processing aids), and tech support calls are answered energetically and in depth. Bars and Pipes is a major new player on the Amiga music scene, with plenty of power, features, and flexibility. Don't hesitate to get plumbing!

Bars and Pipes
Blue Ribbon Bakery
1248 Clairmont Road
Suite 3D-241
Decatur, GA 30030
404/377-1514
$299
No special requirements. ►



I can achieve more realistic sound with Bars and Pipes than with some other programs because the crescendos and decrescendos are not figured mathematically; I can place them as I feel them. I do wish, however, that the notes were represented in actual musical notation rather than bar notation. It's difficult to tell the difference between an 1/8 note and a 1/16 note by the length of the line.

—George Davis
West Palm Beach, FL


MasterCard
VISA

X-CAD Professional

Design in the bigger picture.

By Ron Bissett

TEARING THROUGH X-CAD Professional's packaging, I could hardly control my trembling fingers. As an owner of both the original X-CAD from Taurus-Impex (a sometimes-difficult Computer Aided Design powerhouse) and the more recent X-CAD Designer (a non-professional model produced by Cadvision, who purchased the original source code), I was eager to see this latest release. My expectations were high, as I had been pleased with Designer.

Inside the box, I discovered a revamped manual, whose index and section tabs make it easier to use than the original documentation.

The program itself will be familiar to Taurus-version owners. Unlike Designer, Pro is basically the same as the original X-CAD, with some powerful and much-needed upgrades. The initial screen is similar but better, and the command-line interface sports a new look. The X and Y mouse coordinates are continually displayed at the cursor, and the redesigned AutoMenus interface is more usable. Most importantly, you can toggle it on or off to accommodate a drawing tablet or a customized interface.



X-CAD Pro has the fastest refresher I have seen. I would like to see the cursor become highlighted when it is directly over the entity you are working with. Drawings would be more precise if a ghost image appeared as you drew. (Now, you must finish your drawing and click the mouse button to see it.) Also, I would like to see an integrated 3-D option.

—*Eric Allen*
Detroit, MI

Taurus-version owners who toiled developing customized alternate menus—ScreenMenus—will be happy to know that X-CAD Professional supports them. ModMenus, the utility in which you create ScreenMenus, carries over one idiosyncracy from the original X-CAD: Its command line window will not close even when you quit the utility. ModMenus performs well, however, and if your machine is equipped with the one-meg Agnus chip, you can run it without shutting down the main program. The ScreenMenus environment is a really great approach to CAD, and X-CAD Pro makes a good thing better by letting you link individual ScreenMenus with the Dynamic Menu System. This speeds menu access and enables you to keep just one menu active at a time—an important feature, as only three or so ScreenMenus can be displayed simultaneously. The ScreenMenu directory contains a few functioning menus that you can customize. For those who prefer to work with a drawing tablet, Cadvision has added support for the popular Summagraphics tablets (R&DL Productions).

Make a Point of It

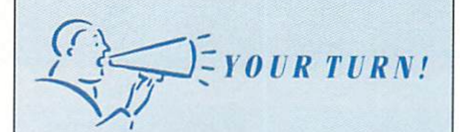
The list of great drawing enhancements includes the Arrow command, which lets ►

you create an arrow with a leader simply by clicking twice. The Label command goes one better by letting you create arrowheads, leaders, and text in one sequence. The Draw Line Horizontal and Draw Line Vertical commands make drawing more accurate and versatile: One click on the screen marks the starting point, and moving the mouse in any direction draws a line in the x or y plane. This feature is very useful, especially because X-CAD Pro's cursor does not register directly beneath the crosshairs; like the original version, it registers one pixel up and to the left.

The Auto Return feature speeds command execution and reduces the need to enter colons from the keyboard or access the AutoMenu. The greatest single addition, however, is the Undo function. Unlike some such approaches that keep track of all individual actions and reverse them one at a time, X-CAD Pro can undo an entire sequence of actions with one command.

A pop-up window lists the files in your drawings or symbols library. The file requester is a super memory aid, but it's slow; luckily, you can toggle it on and off. With the new Backup requester, you can create a temporary backup of any drawing in the directory as you open it. X-CAD Professional does not do timed backups, but this option is the next best thing.

The Attributes feature lets you associate symbols with user-definable, nongraphic data. With this data, you can quickly generate reports defining all or some symbols in a drawing, and estimate materials and costs for a project. You can store this data by setting up a text file called XCDATA:ATTRIBUTE to contain attribute names, data types, and optional notes. (To use this file in the program, you must run it through the CLI's binary compiler, COMPATT.) Assigning attributes to entities is a simple matter of entering a text string or numeric value, depending on the data type specified in the XCDATA:ATTRIBUTE file. You can easily add and delete attribute values for one or all symbols, but the Change Attribute command explained in the manual was not available through the automenu Change Submenu, and could not be typed in manually. Too bad; this feature has vast potential for accurately quantifying project materials and costs.



X-CAD Professional is a powerful, full-featured program with a wide variety of options. Using a colon to enter a command is awkward, however, because it is difficult to hit the Shift key while at the same time holding a mouse button. Also, I wish the command key were easier to use. Finally, the line weight is not consistently uniform.

—*Mark Needham*
Louisville, KY

Reaching Out

The most powerful features, the new database conversion routines, have far-reaching implications. The CLI-accessible XPP command (which should be copied to your root directory) transforms an X-CAD HPGL plot file into Profes- ►

sional Page (Gold Disk) structured drawing format—the same format Draw 2000 (Oxxi/Aegis) uses. Once in Draw 2000, you can transfer the file to Modeler 3D (Oxxi/Aegis) either directly, if only straight lines are needed, or save it using the Modeler.plotdriver first, if you want to retain curves. XPP converts black to white and all other colors to black, so drawings come out looking great in Pro Page. It would be nice, however, if colors were saved as is, because Professional Page supports color output. XSCRIPT, another CLI command, converts X-CAD HPGL plot files to Sculpt-Animate (Byte by Byte) script files. This link to existing 3-D software immediately expands X-CAD Pro's horizons, and is, I think, the right approach to providing solid modeling for this program.

The DXF Input and Output commands carry the broadening theme even further, taking X-CAD Professional from an isolated position into the big CAD arena. These commands allow Pro to read and write files in the popular AutoCad DXF format used on other computer systems. Previously, you could exchange drawings between systems only by plotting to HPGL files and using a conversion utility. While this method works, it usually causes the drawing database to triple in size as text, circles, and dashes become collections of straight lines instead of single entities. As a result, this method also involves lots of editing. The DXF conversion takes care of these problems with a few exceptions. Ellipses and splines do not convert at all. A circle translates as a circle, but its origin becomes the drawing's origin and its radius lengthens. (The solution is to split the circle into two arcs, which convert perfectly.)

Drawing origins are important to coordinate when importing DXF files into X-CAD Pro. Importing a drawing whose origin is in the center into a Viewport whose origin is at the lower left will give you only 1/4 of the drawing. Also, to maintain text placement, you should match the height and width of the text in the two systems. While not every entity is translatable between systems (this is true even among IBM CAD programs), the DXF conversion utility has filled a gaping hole in X-CAD's usability in the professional design world.

The upgrade cost to Taurus-version owners is $199. Technical support is provided by Cadvision, but if you want to avoid overseas calls, you can purchase a support-service package from GRAFX Computing in New York.

X-CAD Professional lives up to its developer's claims. It compares favorably with PC CAD software and offers more features than most. This version's improvements and additions make it flexible, versatile, and a pleasure to use.

X-CAD Professional
Cadvision International Ltd.
London, England
1-603/3313

distributed by American Software Distributors
RR 1 Box 290
Bldg. 30
Urbana, IL 61801
217/643-2050
$499.95
One megabyte required. □



BACKTALK

CANDID RESPONSES TO *AMIGAWORLD* REVIEWS

CrossDOS (Consultron)

In response to the article on CrossDOS (see p. 63 in the January '90 issue), I would like to suggest a solution for what reviewer Tim Walsh sees as the most difficult part of using the program. The way I mount either a 3.5- or 5.25-inch drive is to place a project-type icon with the default tool as SYS:C/ICONX in the Workbench C directory, and include a script file with the same name as the icon with the required mount statement. I also find that the AmigaDOS 1.3 MOUNT command works fine in place of the MOUNTJDS. Mounting the drives then becomes as simple as clicking on an icon and letting ICONX do the work.

—Steve Burroughs
Bossier City, LA

Mounting CrossDOS from my startup-sequence allows the program to access MS-DOS disks from software that provides for drive selection. Because of this feature, I can read an IBM version of a WordPerfect file from an MS-DOS disk with my Amiga version of WordPerfect and write it back to the same disk—without any extra work. Also, the reviewer says that the system's major limitation is incompatibility with high-density floppies; it would be more accurate to say that Amiga *drives* are incapable of reading from and writing to high-density floppies.

—Bill MacMillan
Delta, BC, Canada

The Vault (Progressive), A590 (Commodore), and HD-500 (Imtronics)

I read with interest your review of three hard-disk systems for the A500 (see p. 82 in the January '90 issue). You gave read/write DiskPerf 2.0 results, but did not state the size of the buffer. Was it 256K? I need to know in order to compare with the test results from the drives covered in the July '89 issue (p. 22).

—Bill MacMillan
Delta, BC, Canada

Yes, the buffer size was 256K.
—Lou Wallace

CLAS (MicroEd)

I own CLAS (reviewed on p. 82 of the September '89 issue) and find it quite good. I installed it on my hard drive shortly after buying it. Recently, my drive crashed. Upon reinstalling the drive, I found that CLAS had been lost. I called MicroEd, and the company sent me the latest upgrade without hassle and at no cost. That's what I call product support!

—Normand Morin
Levack, Ontario, Canada ■

WHAT'S NEW?

"When you have a mind to laugh, you shall see me fat and sleek. . ." (Horace)

Compiled by Jan Jackson

HEAVY

DO YOU SOMETIMES suspect that food is your enemy? Then you will feel right at home with the Diet Riot segment of **Future Classics** ($49.95), a five-in-one arcade-action game pack. Squeeze through a course while munching tempting treats in your path; every swallow adds to your weight so you must periodically reduce at designated areas. The LIVE Studios' (30151 Branding Iron Rd., San Juan Capistrano, CA 92675, 714/661-8337) game package also includes Diskman, a game that features a superhero dedicated to protecting your system from pernicious viruses; Tankbattle, wherein you strive to capture an enemy coat of arms; Blockalanche, which has you stacking blocks geometrically; and Lost 'N Maze, which challenges you to circumvent towering, impenetrable walls and look for treasure. *RS# 504.*



You can run, but there's no way you can hide.

WALKING TALL

DO EXPANSION DEVICES kick sand on your power supply's blanket? Power-draining add-ons can tax the stock A500 power box, but you can give your system muscles with an enhanced, replacement power supply from Computers, Etc! (4521-A Bee Ridge Rd., Sarasota, FL 34233, 813/377-1121). The base **HD150** ($129.95) model sports a 165-watt switch box complete with connectors. The deluxe **HD150DL** ($179.95) model is a bolstered version of the base unit and features three external A/C outlets, an internal cooling fan, and separate fuse protectors.

Is that your PC-emulator talking? The ordinary Bridgeboard-equipped A2000 will not recognize audio output from a PC program, but thanks to Computers, Etc!, you can wire your board for sound. The **Bridgeboard Speaker Kit** ($24.95) comes complete with pre-assembled hardware for a do-it-yourself installation. *RS# 502.*

GOLDEN CALF

IF YOU HAVE ever fantasized of clicking on your boss's face to open a file that holds. . . oh, let's say your resume. . . check out **Hermes IconLab** ($34.95) from Elkon Enterprises (4654 Mistletoe St., Wichita Falls, TX 76310, 817/691-0964). The program frees you from those desk drawers, document symbols, and other ordinary representations. You can reduce an IFF or HAM image or draw original icons. The package converts color images to black and white and has frame-capture and color-mixing capabilities. *RS# 503.*

And Then Some

GRAB YOUR TANKS and fins! It's time for adventure in paradise with *Treasure Trap*, an action-strategy title from Electronic Zoo (3431-A Benson Ave., Baltimore, MD 21227, 301/646-5031). Dive for countless riches in the wreck of the gold-laden Esmerelda while avoiding slithering eels, poisonous jellyfish, powerful stingrays, and other aquatic menaces. *RS# 505.*

Now you can write to all your Russian friends on your Amiga with *Cyrillic Alphabets 2.0* ($44.95). The program can handle Macedonian, Serbian, Bulgarian, and Ukrainian as well. You get three keyboard layouts for each language: Soviet typewriter, phonetic American "qwerty," and a 47-key computer setup. Each font includes English letters so you can combine them with Slavic in one document. You can use Cyrillic Alphabets with any program compatible with the Amiga's alternate character set. *RS# 506.*

Help a brave band of adventurers seek out and vanquish a malevolent alien criminal before he destroys the world of Cron. As your party proceeds in its quest, more and more obstacles bar its path while hundreds of bloodthirsty, ravenous monsters plague the group. Help combat these fiends with your arsenal of over 250 weapons, mystic items, and devastating spells. Take a deep breath before contacting New World Computing (14922 Calvert St., Van Nuys, CA 91411, 818/785-0401). *RS# 507.*

Hail, *C-Zar 2.4!* This editor/librarian for the Casio CZ series keyboards is showing off some new screen gadgets and resizeable windows. C-Zar has learned to share the serial port with other MIDI programs. New preset sounds and operations memories also ►

appear on the list of new features. Registered owners can upgrade by sending $10 plus their original disk to Diemer Development (12814 Landale, Studio City, CA 91604-1351, 818/762-0804). *RS# 508.*

Get in on a *Wrap Session* ($79.95). This seven-disk set offers op-art patterns, gray scale, HAM, and full-color wraps.

Take a still video tour with *Vermont Seasons (Summer)* ($39), the first of a promised set of scenes from the Green Mountain state. You can set these images to interlace with other software, and use them as backgrounds for genlocking and animation.

GENamations ($49) are animations that use the transparent color techniques of the Amiga's color 0 register in order to allow you greater freedom in tailoring genlocked video.

For your desktop-publishing endeavors, *World Symbol Library* ($44.95) includes multicultural images stored as 300- and 200-dpi line art, hi-res gray scale images, and a selection of full-color versions.

Satisfy the Marlon Perkins in you with *AMIzoo* ($44.95), a set of full-color hi-res brushes of frogs, fish, and birds—with more animal friends promised in upcoming releases.

Boldly go where no man has gone before with *Amiga-SF* ($69.95), a package that gives your videos a science-fiction flair. These ANIMbrushes of space vehicles represent the first release in a collection of futuristic images in 3-D, eight-color hi-res.

Need musical backdrops for your presentations? Take note of *Fat Sounds* ($59.95), sampled sounds with file sizes larger than 8SVX. Items from Wrap Session to Fat Sounds are available from Go-Amigo, 2682D Middlefield Rd, Redwood City, CA 94063, 800/232-6442, or in California: 800/843-2842. *RS# 509.*

Props, with its HAM-brush images of animals, structures, and trees, and *Flowers* ($24.95), containing digitized and hand-painted floral-pattern HAM brushes, can speed your work with Scene Generator from Natural Graphics. Props and Flowers are available for $24.95 each from Eyeful Towers Communications (15 Rockydale, Bristol, VT 05443, 802/453-4293). *RS# 510.*

Combining the glorious tradition of outer space chivalry with domestic detective work, Euroline Group (1244 N. Orange Dr., Suite 206, Hollywood, CA 90038, 213/462-5013) has come up with a combined release, *Space Knight and Hotel Detective* ($29.95). When you tire of racing about the universe in your star glider, you can hop over to a grand hotel to root out danger sure to be lurking about the guest rooms. *RS# 511.*

Next you are off to rescue the fair Athena, daughter of Zeus, in *Altered Beast* ($49.95) from Sega. As a warrior bestowed with powers of transformation, you must battle, conquer, and capture spirit balls to magnify your metamorphic abilities. Your adversaries include crocodile worms, hammer demons, and grave masters. Begin the change by contacting Electronic Arts (1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171). *RS# 512.*

The infamous Shredder is tearing up the sewers of New York City. . .and your pizza-powered *Teenage Mutant Ninja Turtles* ($44.95), bearing nunchakus and wacko bombs, are ready for retaliation. All they need is the go-ahead from you and Konami Inc. (900 Deerfield Parkway, Buffalo Grove, IL 60089, 708/215-5100). *RS# 514.*

What do Buffalo Bill, Elvira, and Michael Jackson have in common? They all star in adventure-strategy games from Box Office Software (available through Keypunch Corp., PO Box 7008, St. Paul, MN 55107, 612/292-1490). *Buffalo Bill's Rodeo Games* ($29.99) tests your shooting, steer wrestling, and stage-coach rescuing abilities; *Elvira's Horrorsoft: A Personal Nightmare* ($29.99) offers chill-inducing animations, and *Moonwalker* ($34.99), based on a Michael Jackson movie, attempts to draw you into the action. Help Michael dance along while avoiding pesky fans. *RS# 515.*

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HELP KEY

Whether you're mad as a March hare or feeling like an April fool, Lou will bring you to your senses.

By Louis R. Wallace

Book Learning

Q: *I just purchased an Amiga 2000, and I am having problems learning to use AmigaDOS. Do you know of any books on AmigaDOS that are similar to Richard Immers'* Inside Commodore DOS?

M. Kiker
Orange Park, FL

A: One of the best books available on AmigaDOS is Rob Peck's *The Amiga Companion* ($19.95). The revised second edition includes full information on version 1.3 of the operating system and is available by calling the *AmigaWorld* order line, 800/343-0728.

Spiff It Up

Q: *How can I change the icon the RAM disk uses? I have fancy icons for all the other drives, but the RAM icon looks like a poor cousin.*

J. McRand
Charlotte, NC

A: The Disk.info icon file defines how a disk drive icon looks. If none is present, the system uses the plain default icon you see for the RAM disk. To give your RAM disk icon a facelift, create a disk icon using your favorite icon editor. Once you have saved the new Disk.info icon file to a safe location on disk (perhaps in an Icon drawer), copy it to the RAM disk. To make it take effect, issue the LOADWB command from the Shell. The new disk icon will become the default for the RAM disk.

If you want to automate the procedure, add the following line to your startup-sequence before the LOADWB command:

```
COPY Icon/Disk.info to RAM:
```

Map It Out

Q: *Help! I am a wildlife and habitat biologist. Two years ago I bought an Amiga in the hopes that a Geographic Information System (GIS) program or map-making software would be available eventually. Although this is a 200 million dollar a year market I still cannot find anything! Are there any GIS or map-making programs for the Amiga?*

D. Bader
Anchorage, AK

A: I don't know of any GIS software or map-making programs. If anyone else does, please write to me with the information. I will pass it on through Help Key. I must admit that with more than a million Amigas on the market (many of which are in the hands of scientists and engineers) I am constantly astonished at the lack of commercial scientific and technical software.

Random Luck

Q: *I am having a terrible time making a random file work in Amiga Basic. I open the random file, define the various fields using the FIELD statement, then assign string values to the fielded variables. If I print the field variables from within the program they are fine, but when I examine the resulting file it is completely empty, yet is the proper size in bytes! Is there a bug in random files in Amiga Basic?*

J. Galdenstein
Akron, OH

A: Rather than a bug, the problem sounds like a common error in your use of fielded variables. Keep in mind that the correct way of assigning a value to a field variable is through the LSET or RSET command. Below is a simple example of using field variables in a random file.

```
' open the file
OPEN "R",#1,"Test",32
FIELD #1,11 AS F$,11 AS L$,10 AS P$
' the file is defined as 32
' bytes per record, equal to the sum
' of the three field variables' sizes
' input the information for 10
' names and phone numbers
FOR I%=1 TO 10
  INPUT "Firstname=";A$
  LSET F$=A$
  INPUT "Lastname=";A$
  LSET L$=A$
  INPUT "Phone number=";A$
  LSET P$=A$
  PUT #1,I%
NEXT I%
' close the file and exit
CLOSE #1
END
```

Notice I used a standard string variable to input the data, then used the LSET command to assign the value to the fielded variables. If I had assigned them as I would a normal variable (for example, F$=A$) they would have become standard string variables instead of fielded variables. While they would have contained the proper information if I had printed them out, when I issued the PUT #1,I% command, it would have placed NULL strings into the data file. The result would be a file filled with empty data such as you described. I suggest you examine your program to check if you inadvertantly treated the field variables as if they were normal variables. If you did, make the correction and see if your program runs correctly. ■

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HORS D'OEUVRES

Hints, tips and techniques from your fellow Amiga users.

Compiled by Tim Walsh

Smoother Animations

WHILE SETTING UP a series of DeluxePaint III (Electronic Arts) animations to run within Elan Design's Elan Performer, I discovered a method for getting smoother animations. Apparently, DeluxePaint III saves two extra animation frames during the Save Anim procedure, which, under normal circumstances, provide for smoother continuous loop animations. However, within Elan Performer, a glitch appears between animations when two or more DPaint animation files are combined.

Circumventing this problem is easy. Suppose you've created, say, an animation consisting of 30 frames. When prompted by the Save Anim requester to save Frames 1 to 30, change the 30 to 28, then save the animation. It will be saved in its entirety, and the finished animation can be run in Elan Performer back to back with other animations without a hitch. Note: Don't use this procedure if you intend to run the animation within DeluxePaint III, because DPaint needs the two extra animation frames for smooth execution.

Craig Hollenback
Cos Cob, CT

RAM-Resident Form Feed

IF YOU DO a lot of printing, you probably long for a way to issue a form-feed command to your printer from your Amiga. Why not create a tiny batch file named FFEED that can be kept in your RAM Disk? From the CLI or Shell, type the following command, which sends what you type to the RAM-resident FFEED file:

```
COPY * RAM:FFEEED
ECHO >PRT: <CTRL L>
```

Now press CTRL \ to close the RAM:FFEED file. To get FFEED to run from any current directory, type the following:

```
PROTECT RAM:FFEED+S
```

Now, typing EXECUTE FFEED from any CLI or Shell window will cause the printer to perform a form feed. You can easily save a copy of this utility to disk as a short script file, provided you create it on a text editor that lets you enter the CTRL L sequence without ill effects.

Barry Harvey
Los Altos, CA

Bridgeboard Color

IF YOUR SYSTEM is equipped with an A2088 or A2286 Bridgeboard that you'd like to have default to the color screen rather than the monochrome screen on startup, the solution is only a few keystrokes away.

First, activate the Bridgeboard and create an autoexec.bat file by typing the following:

```
COPY CON AUTOEXEC.BAT
```

Next, type the following to set the color mode:

```
MODE CO80
DATE
TIME
```

Finally, press CTRL Z and then Return. The autoexec.bat file will be saved to your DOS disk in the Bridgeboard's drive. As most experienced PC users know, the date and time commands are optional. The next time you boot your Bridgeboard with that MS-DOS boot disk, it will default to the Color mode.

Ben Oshrin
Miller Place, NY

B.A.D. Solutions

IF YOU HAVE only one disk drive and intend to use B.A.D. (Blitz A Disk) by M.V. Micro, you'll normally have to go through a lot of work to create fast-loading disks. According to the B.A.D. documentation, "Expect processing times of around 30–45 minutes for a full disk, with faster times for disks not yet filled." So, plan on setting aside an afternoon or two and suffering through numerous disk swaps for each Blitzed disk you create.

However, if you have a megabyte or more of memory and AmigaDOS 1.3, create a recoverable RAM disk, or RAD. Set the original disk in DF0 and assign the RAD as the destination drive. When the Blitzing process is finished, copy the entire RAD disk to a destination disk in DF0. This entire process can be performed in a fraction of the time of a normal single-drive Blitzing process.

Lee R. Palmer
Westerly, RI

If you have an idea you'd like to share with our readers, send it to Hors d'oeuvres, Amiga-World *Editorial, 80 Elm St., Peterborough, NH 03458. If your idea gets published, you'll receive an* AmigaWorld *surprise gift.* ■



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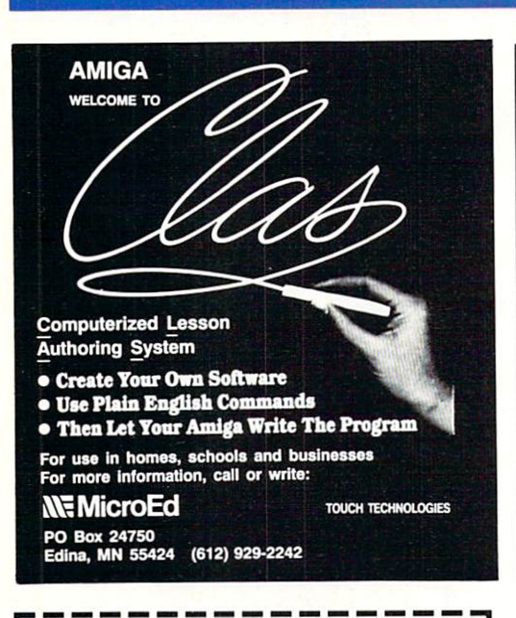
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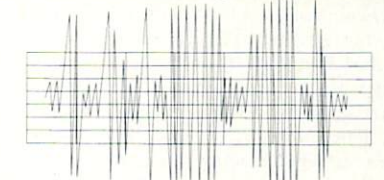
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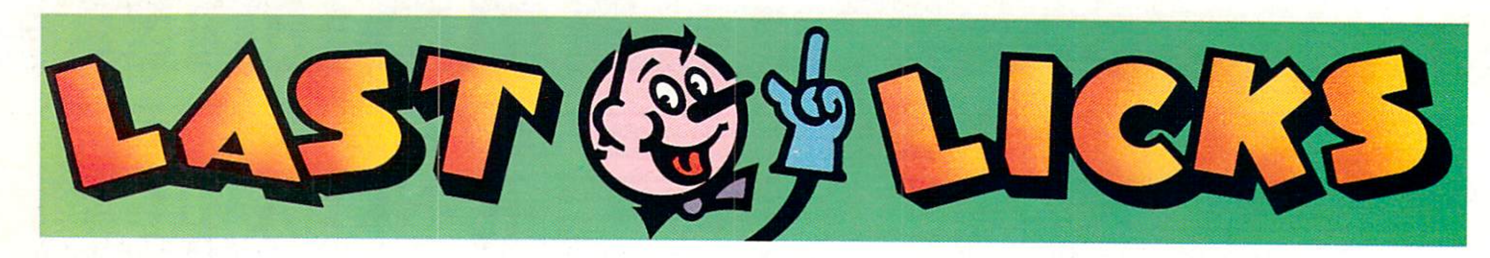
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Maximizing your trip to the software store, bring an oversized jacket, some stick'um, and walk away with the best new packages. Read our special credit card scam story, and charge purchases to that guy who stole your girl and insulted your Mom.

July Annual Geek Awards

Every computer's ranks of supporters include geeks and misfits. We'll honor these people in July's Geek Pride Issue and award prizes in several geeky categories—a pocket protector for the best imitation of a NewTek employee and a slide rule for the most lines of code written with absolutely no value.

August: Special Review Issue

In this issue we will test your level of comprehension of the last three issues. What story was found on page 31? Did we like Gold Disk's latest spreadsheet, or did it lose our 1991 budget forecast? This must-have issue will rehash stuff that bored you the first time around.

September: CAD Issue

Here we will profile the biggest cads in the Amiga market. We'll expose the jerks responsible for the virus that wiped out your hard disk, and we will interview the idiots who drove your favorite software company into the ground. You've never heard so many excuses!

October: Annual Swimsuit Issue

This popular issue features industry luminaries wearing the hottest swimwear. See PC-biggy Philippe Kahn in his daring French string bikini. Marvel at Bill Gates' skivvies decorated with snappy C subroutines. And, of course, there's our own Lou Wallace showing off unheard-of storage capacity.

November: Education Issue

This lively, juvenile issue covers everything from keg parties to pick-up lines. Let your computer explain why Mom's car is dented. Discover how to remove bubble gum from the underside of your Amiga. Teach your Amiga to do your homework while you sneak out the window!

December: Game Issue

This issue is a cut above all our competitors. It features a scratch-and-sniff page with pork, beef, fish, and even moose samples. When we say game, we mean game!

Say What?

Question of the Month: "What product would you like to see developed that is not currently available?"

A 24-bit graphic display board. . . developers have taken Amiga's superior graphic abilities for granted. . .4096 colors isn't really enough to do true ray-tracing. Also a program that writes vector graphics files for hi-res film recorders.

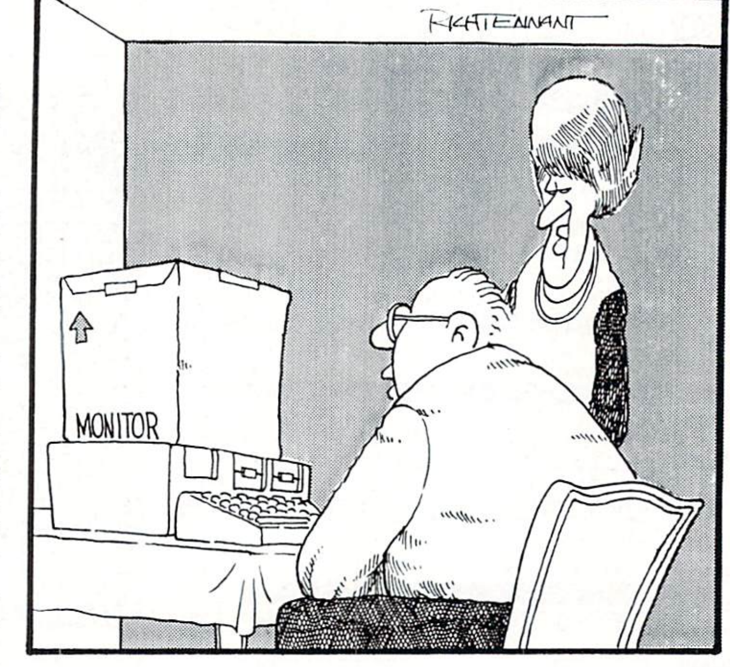
—*Martin Ricketts*
London, Ontario

We could use a direct-to-disk recording interface similar to Digi-Design for the Macintosh instead of using an expensive digital recorder.

—*Jim Dodds*
Champaign, IL

The Video Toaster, an Amiga that doesn't crash, and greater recognition in the computer community.

—*Gary Davis*
Culver City, CA



"RESPONSE TIME SEEMS A BIT SLOW."

Ear to the Wall

Brand-New Operation: Workbench 2.0 (formerly known as Workbench 1.4) is set for release early this year. Owners of the A1000, which will not support 2.0, will be targeted by an aggressive trade-in program.

Up And Running: If you are having difficulty connecting with Megagem, makers of fractal-art creativity software, a correct address may be of use to you: 1903 Adria, Santa Maria, CA 93454, 805/349-1104.

Down But Not Dragging: Those trying to get in touch with C Ltd. probably realize the company has closed its doors. Attempts to reach a company representative for comment have so far been fruitless.

B&B Electronics (2863 S. Broadway, Witchita, KS 67216, fax: 316/522-0914) offers limited customer service including repair for current C Ltd. products.

Newly-formed Ricketts Inc. will continue development of former C Ltd. products such as C-View, RAM expansion devices, and a modified Laser Express in parallel format. Ricketts owner Breck Ricketts plans to develop an audio-visual line, as well.

Due to the recent demise of Computer Software Services, US gamesters looking for support (and hints) for Psygnosis packages can send their questions directly to Psygnosis (South Harrington Building, Sefton St., Liverpool L3 4BQ, England, 51 709 5755) or to Micro-Pace Distributors (Commercial Park West, Suite C, 604 N. Country Fair Dr., Champaign, IL 61821, 217/356-1885).

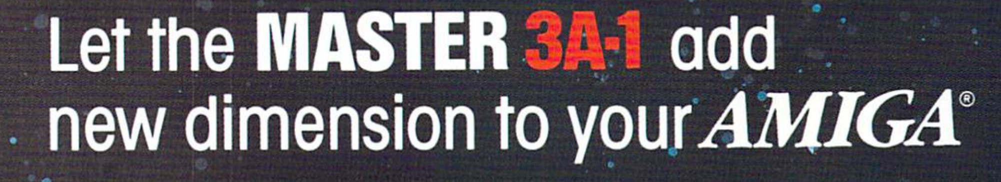
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DIGI·VIEW GOLD

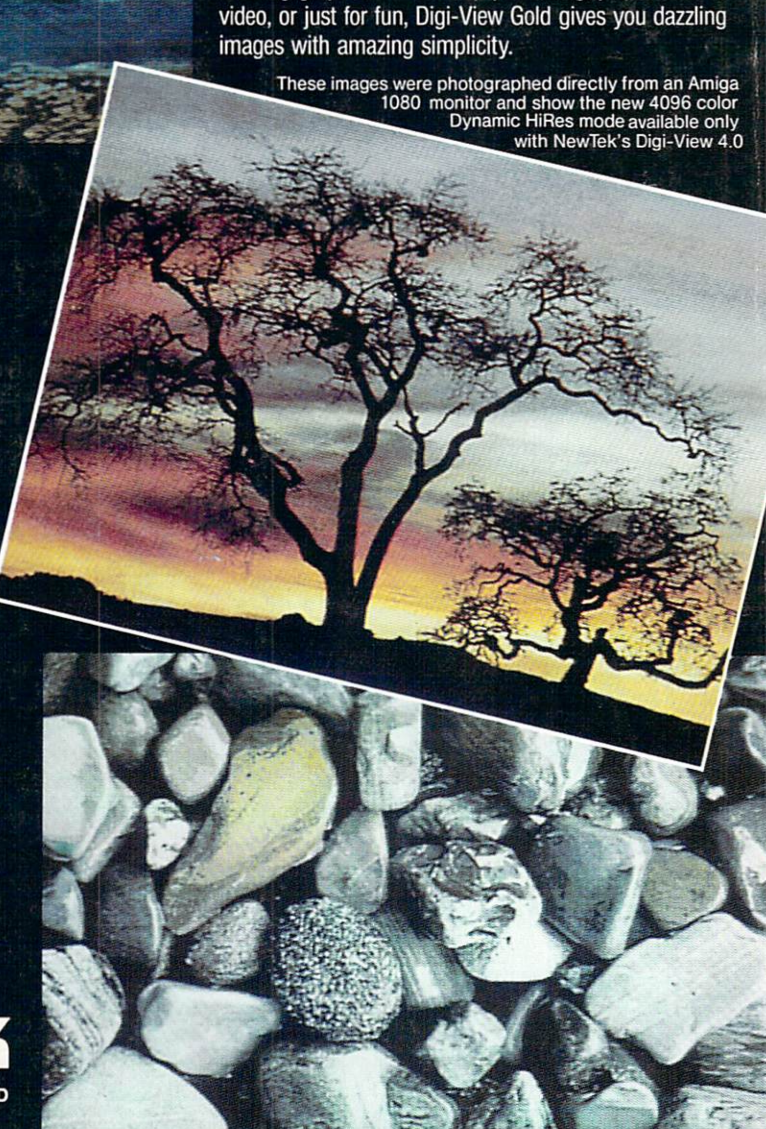
4096 Colors in High Resolution . . . is just the beginning



With the all new Digi-View 4.0 software you can do the one thing most people thought was impossible—digitize and display all 4096 colors in high resolution! We call this revolutionary new graphics mode Dynamic HiRes and you will have to see it on your own screen to believe it. But that's just the start of what makes Digi-View 4.0 a breakthrough. Other new features include: Dynamic HAM (fringe free HAM), Noise Reduction (for the sharpest images ever), ARexx support, super bitmap digitizing, 24 bit color support, 68020/68030 compatibility and dozens of other new features making Digi-View Gold the hottest Amiga graphics product ever.

And it's still just as easy to use. Simply focus your video camera on any object or picture, and in seconds Digi-View Gold turns it into Amiga graphics that glow with vibrant color and stunning clarity. Whether you are creating graphics for desktop publishing, presentations, video, or just for fun, Digi-View Gold gives you dazzling images with amazing simplicity.

These images were photographed directly from an Amiga 1080 monitor and show the new 4096 color Dynamic HiRes mode available only with NewTek's Digi-View 4.0



Digi-View 4.0 and Digi-Paint 3 Become One

with the ultimate link between digitizer and paint program. With Digi-View 4.0's Digi-Port feature they can both share the same screen so that touching-up your digitized images is easier than ever. Transfer 768x480, 4096 color super bitmaps from Digi-View 4.0 to Digi-Paint 3 with a simple menu command, make changes such as combining images or adding titles, and redisplay them as Dynamic HiRes or other resolution images.

Only Digi-View Gold:

- Digitizes in all Amiga resolution modes from 320x200 up to 768x480 (full HiRes overscan)
- Uses 2 to 4096 colors (including halfbrite)
- Has exclusive Dynamic modes for 4096 colors in HiRes
- Digitizes in 21 bits per pixel (2.1 million colors) for the highest quality images possible
- Has advanced dithering routines that give an apparent 100,000 colors on screen simultaneously
- Comes with an icon driven slideshow program for presentations using both IFF and Dynamic images
- Has complete software control of color saturation, brightness, sharpness, hue, resolution, and palette
- Offers an unprecedented lifetime warranty and toll-free support line

If you want the best graphics possible for your Amiga, then get best selling video digitizer of all time: Digi-View Gold.

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Digi-View Gold is available now at your local Amiga dealer. **Or call 1-800-843-8934. Digi-View Owners call for "Instant" upgrade to 4.0 software today.**



*Requires standard gender changer for use with Amiga 1000. Dynamic HiRes requires 2 megs of RAM. Digi-View Gold is a trademark of NewTek, Inc. If you want a Toaster then get your bread ready...

Circle 119 on Reader Service card.